Model Engineer

THE MAGAZINE FOR THE MECHANICALLY MINDED

IN THIS ISSUE

Be-a-Judge COMPETITION ENTRY FORM

ONE SHILLING 11 MAY 1961 VOL 124 NO 3122

MORE SHIP MODELLING BOOKS

A SHIP MODELLER'S LOGBOOK *by John N. C. Lewis.* 200 pages. A valuable introduction to lightweight ship modelling written especially for the beginner. After providing some essential background information on the various types of museum ship model and the evolution of the sailing ship through the ages, the author gives practical building instructions for a series of models, among them a decorative half model and a sailing model of a Grand Banks fishing schooner. The book is illustrated with many photographs of the models of the ships described and with fourteen accurate scale plans. In addition, there are over one hundred detailed drawings by the author. **7s. 6d.**, post 9d. (U.S.A. and Canada $2.00, post paid.)

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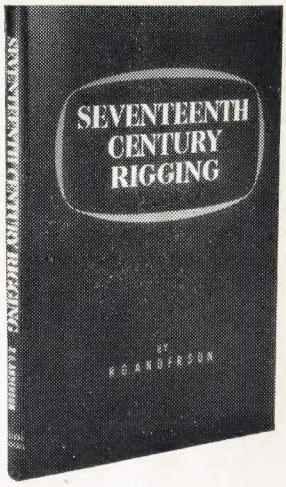
THE HISTORY OF MODEL POWER BOATS *by E. T Westbury.* The author, who is well known in this and other model engineering activities, has produced a comprehensive history of the model power boat club and a very complete study of the evolution of the model power boat. **3s. 6d.**, post 4d. (U.S.A. and Canada $1.00, post paid.)

THE FOUR-MASTED BARQUE *by E. Bowness.* The author is well known to readers of MODEL ENGINEER for his articles on ship modelling and maritime topics. In this book the 4-mast barque, as a type, has been most carefully analysed, and the many variations in form and rig are described and illustrated. 128 pages, 88 figures, 44 plates, 3 folding plans. **9s. 6d.**, post 1s. (U.S.A. and Canada $2.25, post paid.)

FAMOUS PADDLE STEAMERS *by F. C. Hambleton.* 104 pages. Many drawings and diagrams. Describes some of the best known paddle steamers plying on the Thames and around the South Coast, together with those more widely known in connection with cross-Channel services. The book contains, among its many illustrations, drawings specially prepared for the model-maker who may wish either to make small water-line models or larger full-hull models or even a fully authentic, working model. The book contains also some interesting anecdotes in connection with these popular craft. **6s.**, post 9d. (U.S.A. and Canada $2.25, post paid).



SAILING TRAWLERS *by Edgar J. March* Captures for all time a vanished age of sail—the life afloat, the seamanship, the methods of working, the construction and rigs of that vast fleet of sailing trawlers once worked out from the East Coast ports. Fully described hull construction, sail-making, various rigs, etc., with some 181 magnificent photographs—some nearly a century old—and a complete set of drawings of every detail of the Lowestoft trawler, *The Master Hand.* 498 pp. **63s.**, post 1s. 9d. (U.S.A. and Canada $12.50, post. paid.)

THE TEA CLIPPERS *by D. R. MacGregor* With a wealth of detail, the design and construction of the famous fast-sailing ships which were built expressly to race tea from China to the London market are described and superbly illustrated. A number of folding plans, drawings, and over 40 reproductions from famous paintings and early photographs are included. Seven plates give lines of six particular ships; also spare dimensions and rules for tonnage measurement. Comprehensive index; bibliography. 194 pp. **25s.**, post 1s. (U.S.A. and Canada $5.00, post paid.)

THE ANATOMY OF NELSON'S SHIPS *by Dr. C. Nepean Longridge.* Describes the construction of the ships of the Nelson period with drawings and the only existing photographs showing the hull construction of two of the ships which actually fought at Trafalgar. Gives a complete description of the masts, spars and rigging of H.M.S. *Victory* and tells of how the author built his important model of her. A series of five large scale folding plates, showing both hull and rigging, complete what is undoubtedly a most comprehensive and reliable book. 272 pages. **63s.**, post 1s. (U.S.A. and Canada $12.50, post paid).

SEVENTEENTH CENTURY RIGGING *by R. C. Anderson, Litt.D., F.S.A.* 148 pages; 23 folded sheets of drawings incorporating 282 figures; nine photo plates. Based on the author's previous successful work *The Rigging of Ships in the Days of the Spritsail Topmast*, 1600-1720. This superb work contains a full-size rigging plan of the *St. George* of 1701 drawn by Mr. L. A. Pritchard, together with the author's sketches and notes; also a number of photographs showing details of the rigging. Dr. Anderson is recognised the world over as the leading authority on the rigging of ships of this period. **25s.**, post 1s. (U.S.A. and Canada $5.00, post paid.)

MODEL SAILING YACHTS *by W. J. Daniels and H. B. Tucker.* Gives an all-round picture of model yacht racing. Tables of offsets, constructional and operational details for the building of 10-raters. M-class and 36-in. R-class yachts. Methods of building and sailing are explained in a clear and concise style. **10s. 6d.**, post 9d. (U.S.A. and Canada $2.50, post paid.)

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FLAGS FOR SHIP MODELLERS AND MARINE ARTISTS *by Alec. A. Purves.* As with all technical matters, the science of flags is not a simple subject and many pitfalls await the unwary. This book explains the subject fully. **3s. 6d.**, post 4d. (U.S.A. and Canada $1.00, post paid.)

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SHIPBUILDING IN MINIATURE *by Donald McNarry.* 160 pages. 40 illustrations and plates with drawings and photographs by the author. Mr. McNarry has exhibited many of his models at the Model Engineer Exhibition and has won numerous silver and bronze medals. His work embraces models from Tudor times to modern liners of the latest type. He puts his long experience at the disposal of the reader, who is given detailed instruction stage by stage, from the purchase of materials —what to buy and where to buy—to the last finishing touches. **12s. 6d.**, post 1s. (U.S.A. and Canada $3.00, post paid.)

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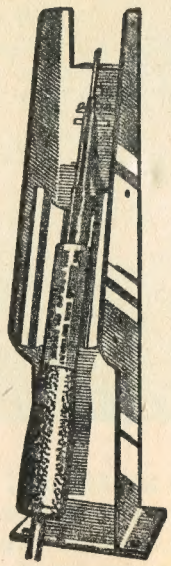

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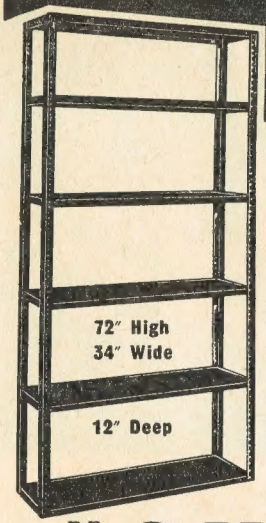

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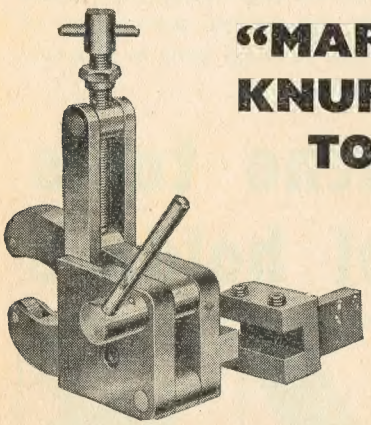

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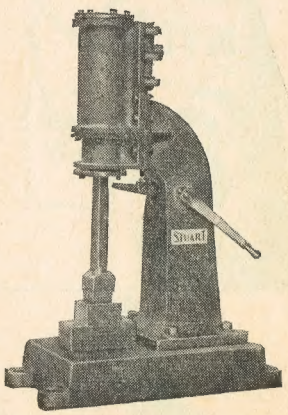

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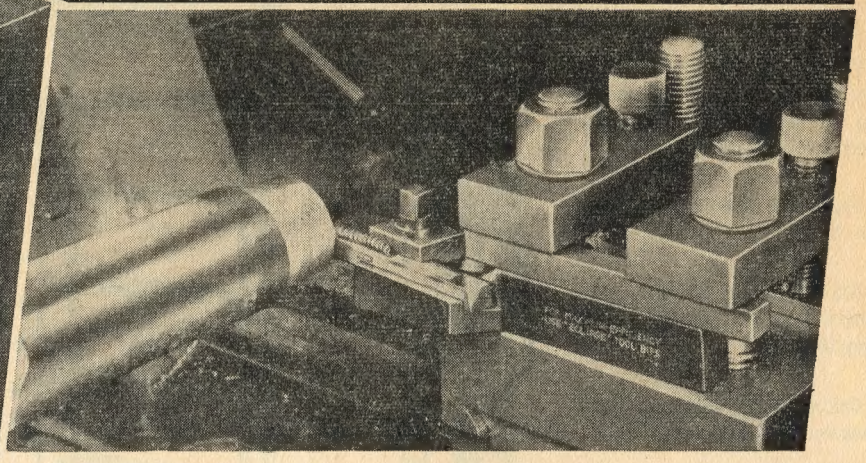

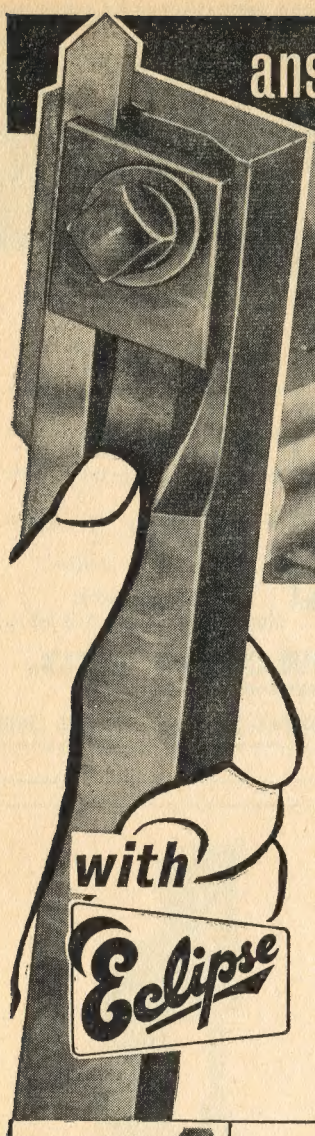

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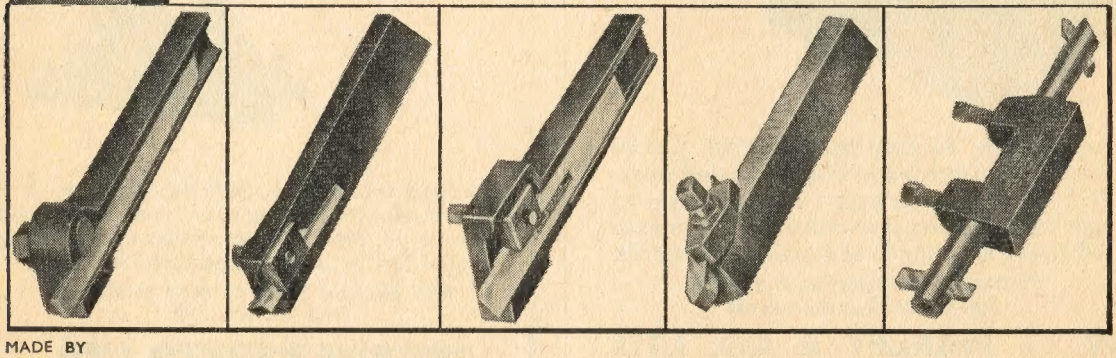

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Model Engineer

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COVER PICTURE

One of the oldest trams still infservice in Britain. Picture was taken by Model Engineer cameraman, Brian Western, while on an assignment in Scotland.

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The Editor is pleased to consider contributions for publication in MODEL ENGINEER. Manuscripts should be accompanied by photographs and/or drawings and should have a stamped addressed envelope for their return if unsuitable. None of the contents of MODEL ENGINEER may be reproduced without written permission.

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A WEEKLY COMMENTARY

Smoke Rings

By VULCAN

WILL the enormous electrification programme of British Railways be out of date by the time it is completed ?

If the invention of a Bristol model engineer, Mr Geoffrey Hunt, is taken up by the boffins it might well be.

Mr Hunt's idea, which has proved successful in initial experiments, is to dispense with the complicated magnetic field, rotor and gear drive of electric transmission and replace them with a powerful coil on the locomotive and a magnetic bar centrally placed between the rails.

The magnetic field thrown out by the coil in the engine, or bogie unit of multiple stock, sets up an attraction to ladder-like sections in the centre "rail" and hauls the train along.

No moving parts

If this proves practical, in one magnificent sweep Mr Hunt will have disposed of gear wheels, rotating motors and a great deal of the complicated apparatus associated with modern electric locomotives.

There is one problem which he has not yet solved. Perhaps some reader can help. He needs a reasonable stretch of 10¼ in. gauge track—about a mile he thinks— on which he can run his experimental linear conductor locomotive at high speed. I will be pleased to pass on any suggestions.

Mr Hunt's invention has already been featured in the *Bristol Evening Post*, to whom I am indebted for the illustration. I wish him every success with his idea.

Coping with nature

WHEN the American railway pioneers laid their lines they had to meet the problem created by wandering animals which strayed on the track. Their answer was the picturesquely named cow-catcher.

On Britain, where all our lines are fenced, trouble with inquisitive animals seldom arises, though the occasional dog or cat commits suicide in most areas.

But abroad, where it is uneconomic to fence thousands of miles of track, the wandering beast can often disrupt a train service.

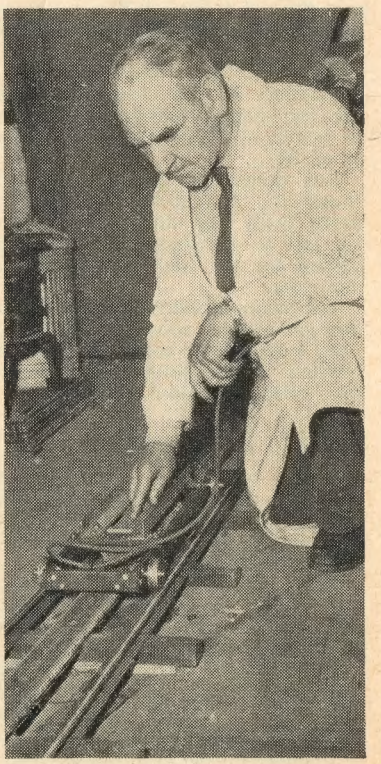
Mr R. O. Windsor, of Salisbury, Southern Rhodesia, tells me of an instance where an elephant created chaos. He sauntered on to the line in the middle of the night and was run into by a Bulawayo train. He crashed off into the bush.

The driver of the north bound mail, waiting to leave Nengasha when the Bulawayo train halted there, was alerted to the elephant's presence.

Back on the track

Speed was kept down and when the elephant was spotted—on the track again and apparently none the worse for having been hit by an engine—the mail was stopped.

Inducements to move the giant beast proved fruitless, and a game warden was sent for. After a delay of



Geoffrey Hunt preparing his linear conductor "skate" to demonstrate its efficiency

two hours the animal had to be shot. But his body fell across the line, which caused another four hours' delay before the train could proceed.

" The . . . Railways regret that this train is a day late which is due to an elephant in the permanent way."

Poaching by train

WHEN I opened my morning paper the other day my mind went back to an article which LBSC wrote several years ago.

He told how enginemen, looking for a cheap supper, were in the habit of hurling lumps of coal at the rabbits sporting on the banks of a Surrey cutting. Sign language exchanged with a passing platelayer or nearby signalman ensured that any bag was duly collected.

Apparently this form of sport—of which I must say I disapprove—has a 1961 exponent, though the modern one arms himself with a shotgun.

Twigs snapped

Two days before Christmas, reports the *Daily Express*, 51-year-old Alan Youngman stopped his train of two trucks and a brake van where the line runs through Captain's Wood, a game preserve, on the Hatfield-Hertford line.

With his gun under his arm, Youngman hopped down from the cab and disappeared into the woods in search of a pheasant. The train stood by.

But deeper in the wood David Mansfield, 27-year-old gamekeeper, heard twigs snap and a gun crack. He ran to investigate. Youngman dashed for the train, but that was departing.

The encounter between engine driver and gamekeeper subsequently led to Alan Youngman's being fined £75 at Hertford Quarter Sessions last month for " offering violence with a gun."

Mr T. F. Bowman

IT was with deep regret that I learnt of the sudden death of Mr T. F. Bowman, senior partner of Frederick Bowman, one of London's oldest foundries.

Not only do I feel a personal loss, for we had been friends for many years, but the passing of a craftsman of his calibre is a blow to the industry.

Foundrywork may not have the glamour that the highly mechanised automated industries possess, but before the assembly line can turn out its millions of mass-produced products there must first be a prototype. And the design of a prototype calls for individual skill.

Skilled craftsman

The Bowman foundry specialises in individual craftsmanship and its customers include such nationally known concerns as Ilfords, the British Broadcasting Corporation, and the highly successful Lotus car company. All totally different interests, but all demanding the highest quality castings for use in their experimental departments.

Percival Marshall Ltd have been associated with this old established foundry since the early days of the MODEL ENGINEER workshop. Bowmans have supplied us with castings for our own experimental models and mechanisms.

The Bowman family have a high regard for the work of the model engineer and this no doubt springs from the respect that one craftsman feels for another.

Very helpful

I know of instances where a reader has had a problem in pattern making and one of the Bowman family has provided professional advice to solve the problem. In some cases even the wood for the patterns has been offered —and no fee has been asked.

The love of his craft kept Mr T. C. Bowman at his foundry until four days before his untimely death. In fact, it was only two short years ago that our cover pictured Mr Bowman at his bench.

Although just over three score years and ten, he looked no more than 60, for he was an extremely active man. To his wife and his son, who will continue to run the business, we offer our deepest sympathy.

Next week

The immaculate draughtsmanship of the late Mr J. N. Maskelyne is extremely familiar to readers. His fastidious attention to detail is described by Noel Maskelyne, his brother, in the issue for May 25.

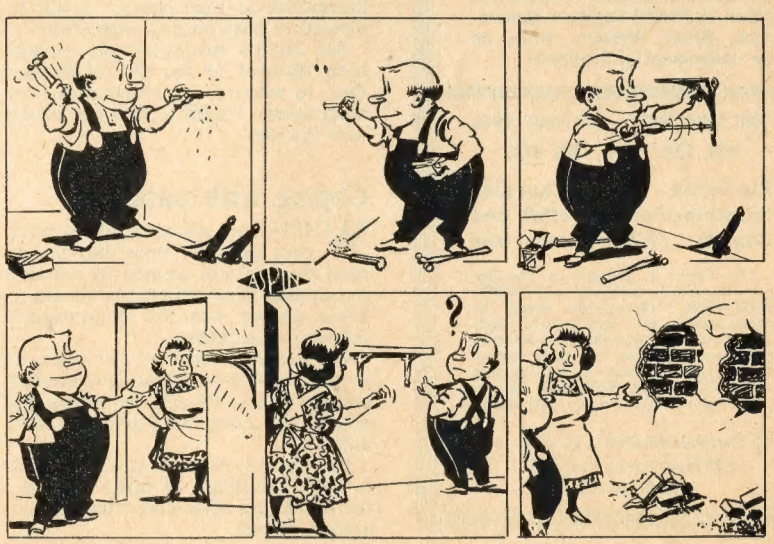
Rovers

IT was a year ago that journalist Robin Orchard and photographer Brian Western, both of MODEL ENGINEER, began the formidable task of securing details and pictures of the last remaining steam locomotives on British Railways.

Their assignments have taken them all over Britain (with the exception, of course, of Northern Ireland which is not within the system of British Railways) and their collection of data in Library of Locomotives is already providing valuable information for modellers.

They are not averse to picking up the chance picture, which may not relate to railways. An example is the cover picture of a Glasgow tram which was secured during a week's tour of Scottish locomotive depots.

CHUCK . . . **. . . THE MUDDLE ENGINEER**



Making a case for CANBERRA

Exposed to the atmosphere, a model inevitably decays; properly protected, it may last for centuries.

EDWARD BOWNESS adds some important notes to his serial on the P & O liner

In the last instalment of my serial on modelling the *Canberra* [January 26], I referred to the flags and the bow badge. Appropriate flags can add a welcome touch of colour to any ship model, but they must be used with discretion. On *Canberra* one or two could be introduced with advantage.

The Company's house flag should be worn at the truck of the mast. It is shown in Fig. 51. For the $\frac{1}{16}$ in. scale model it should measure approximately $\frac{1}{4}$ in. × $\frac{3}{16}$ in.

Worn on the staff at the stern is the Red Ensign whose dimensions are about $\frac{1}{2}$ in. × $\frac{1}{4}$ in. for the same size of model. Sometimes the Blue Ensign may be worn. It is allowed only if the officer commanding the vessel is on the active or emergency list of the RN or RNR and if the crew includes officers and men in a similar category. This could well be so with an important ship such as the *Canberra*.

Signal flags, or the ship's number, may be flown from the yardarms, but they may prove a pitfall for the modeller unless he is showing the ship in special circumstances and knows which flags are required to indicate them.

For either $\frac{1}{16}$ in. or 1/32 in. scales flag halliards are not practicable. It is sufficient to glue the flags to their respective poles. They should be made of cigarette paper, or a paper of similar thinness, and painted with water colours on each side. You could crumple them slightly to remove any unnatural stiffness.

The bow badge is to be found on all the later P & O liners. In the view of the *Canberra* on page 421 [October 6] it may be seen just above the hawse hole in the stem. I understand that it is removable, and is actually a cover for the recess which houses the searchlight used when the ship is passing through the Suez Canal. In the $\frac{1}{16}$ in. scale model it measures about $\frac{3}{16}$ in. high; its shape and design are shown in Fig. 52. The device shows the sun with radiating rays rising out of the sea, the sun having a golden face and dark rays with gilded centres. The sea is blue or green.

If the badge is made of smooth card or thin plastic and is painted in bright colours, it will show up well against the white of the hull. Care must be taken that it is glued securely on the curved stem.

Now that we have finished the model the problem of whether to make a case for it must be considered. For the static ship model, as opposed to the working or sailing model, there is no question that a case is advisable. You may be tempted to heave a sigh of relief, put the model on the sideboard, and sit back to admire it, completely forgetting that from the moment it is finished, and even during its construction, it begins to collect dust. Wherever it is kept, there are certain to be dust or fumes in the atmosphere, and they will sooner or later take effect.

Under cover

Some ship modellers keep their models under cover from the beginning, except when they are actually working on them. When Dr Longridge was building his wonderful model of HMS *Victory*, now in the Science Museum at South Kensington, he made a wooden cage for it, covered with a dust-proof material which, by means of a series of cords and pulleys, he raised when he was working on the model and lowered when work was suspended.

The time to make the case is while the construction urge is still active, and when one's tools are all at hand. Making the case should be considered part of the job.

I realise that some ship modellers and owners of ship models hold the view that a ship model, and especially a large one, should be left free and not confined in a case. In some old mansions models were often displayed without cases, but either their owners did not concern themselves about their preservation or the models were sufficiently robust to survive the attentions of a feather duster.

Some years ago I was called in to a large Victorian house in Holland Park in the West End of London to advise on the disposal of a collection of models. They were chiefly of sailing ships and were suspended from the ceiling of the large entrance hall. The owners of the house were elderly and had evidently lost interest in them; they had not been disturbed for years. When we got them down, they were in an appalling state. The decks were encrusted with dust, and the rigging was rotten and broken. They were beyond repair, except for one or two. What had been a valuable collection was lost through neglect. The ships seemed to have been hung up out of harm's way, but the insidious damage wrought by dust and neglect was obvious. We salvaged two or three of them, a Lowestoft trawler with a wealth of detail, and a clipper ship which had very fine lines and delicate spars. But even these would need great

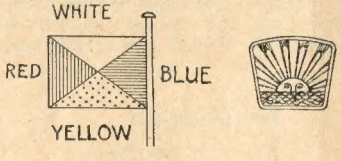


Fig. 51: *House flag. Fig.* 52: *Bow badge*

THE WRONG WAY ROUND

Owing to a reversal in the positions of printing blocks some confusion was caused in the advertisement of Eric H. Bernfield in the issue of April 20.

The positions of the illustrations (6 in. protractor price 11s. and 6 in. capacity vernier caliper gauge price 57s.) were in the wrong places. The bottom one should have been at the top, and vice versa.

Our advertisement department express their regret for this error.

patience and much renewal of parts to make their preservation feasible.

As soon as you have decided to make the case, your first consideration is its size. For a scenic model there should be more relative space around the ship than is usual with the full-hulled model. It gives one more space to do something effective with the sea.

As I have already discussed a number of possibilities in a scenic setting for the model [ME, August 26], it is sufficient here to indicate suitable dimensions for the cases of the two sizes of models suggested in the articles. For the 1/32 in. scale model, which will most probably be a scenic waterline model, I suggest a case 18 in. long × 5 in. wide × 4½ in. high, measured inside the glass. For the $\frac{1}{16}$ in. scale model, if it be full-hulled, I recommend a case 30 in. long × 6 in. wide × 8½ in. high inside the glass, and larger but lower if it is for a water-line model.

Having decided on the dimensions of the case, we can make the baseboard, or the sea for the scenic model. For the full-hulled ship the baseboard should be a piece of well-seasoned hardwood, preferably oak or walnut, or at any rate a wood with an interesting grain.

For the smaller model it should be about $\frac{3}{8}$ in. thick and for the larger one $\frac{5}{8}$ in. The baseboard should be cut and squared true to size, and then oiled or polished to suit the taste of the builder. The holes for the screws supporting the model should be marked out, drilled and countersunk on the underside. They are four in number. Those at the bow and stern are on the centre-line of the ship and midway between stations 2 and 3 and 18 and 19, and those amidships are midway between stations 11 and 12 and about 2 in. apart or 1 in. from the centre-line for the larger model. Many models of this type are supported only along the keel, on the centre-line of the ship, but I consider it better to have two supports amidships for greater security.

Brass rod for pillars

Tie supports or pillars can be of any suitable shape. Those shown in Fig. 53 are practical and easy to make. They should be turned from ½ in. brass rod, drilled for the screw, and polished and lacquered. The upper surface of each must be fitted to the hull, those amidships sloped to suit the very slight rise of floor on the ship, that at the bow hollowed to suit the bulbous keel, and that at the stern grooved to suit the keel, which is rather narrow at this point. A suitable allowance should be made for the narrowness when you are turning (see Fig. 53).

Note that the height of the pillars must be arranged so that the model rests firmly on each of them at each of the four points. With the model in position, drill the holes for the screws with a gimlet, using the baseboard and pillars as a jig. After trying the model in position, lay it aside with the pillars and the screws while you finish the case.

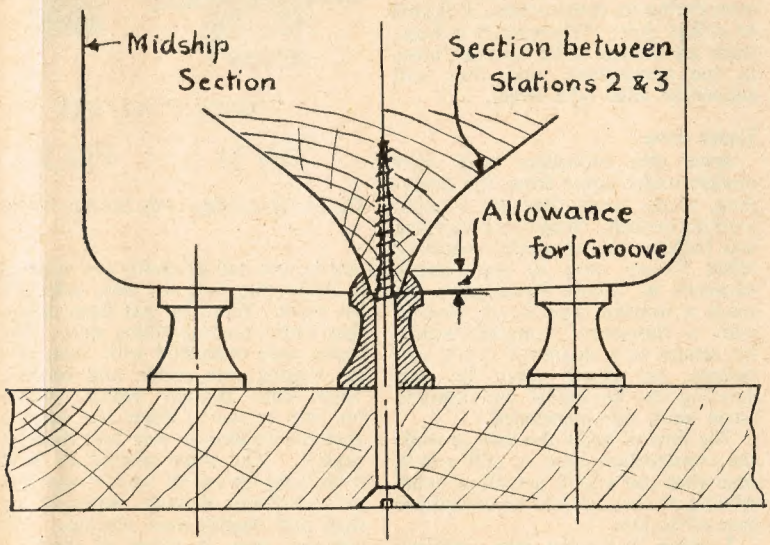


FIG. 53

Fig. 53: Supports for full-hulled model

The baseboard for the waterline model is actually the "sea." The hull, having been cut off at the base-line or l.w.l. (see Fig. 49), can be laid direct. There will be no ripple around the hull if the ship is shown at anchor, unless there is a tide running under the ship, or if she is proceeding under easy steam, when there will be only a slight bow wave and very little disturbance aft. In either event the sea itself can be shown calm; any disturbance in the water may be suggested by varying the colour tones in painting the board.

If you want to indicate a livelier sea, you should carve ripples over the surface of the board with a rather small gouge; in painting, the hollows or troughs should be of a darker blue or green and the waves or ridges of a lighter tone. The ship will still be on an even keel, but the bow wave and the disturbance at the stern will be more pronounced. They can be indicated by pressing a very small amount of plastic wood around the water-line and building up the bow wave and the spreading wake at the stern with additional plastic wood. It is advisable not to overdo these effects as they tend to reduce the apparent size of the ship.

Removable sea

The plastic wood will be a little rough in places, and these should be touched with white. Making an effective sea is quite an art, and is not a matter to be easily explained in writing. Experiment is necessary for success.

Some ship modellers make their cases so that the model can be taken out and repaired if necessary. For this the baseboard or sea is removable so that the model can be taken out from below. A possible arrangement is shown in Fig. 54. Here the base frame is made from wood about ¾ in. thick. The inside of the frame matches up accurately with the inside of the glass and the glass itself is secured by gluing it to a moulding fixed to the frame but set back from the inside of the frame a distance equal to its own thickness. The moulding must be firmly pinned and glued to the frame. Araldite or Durofix or any similar strong adhesive should be used to fix the glass in position. Any excess is scraped off afterwards.

The base or sea, which should have its upper surface approximately level with, or just below, the upper edge of the moulding, is held in position by four strips of brass ⅝ in. wide by about ⅛ in. thick, bent as shown, and is screwed to the underside of the board. You may now fix the model (full-hulled) to the base, using the

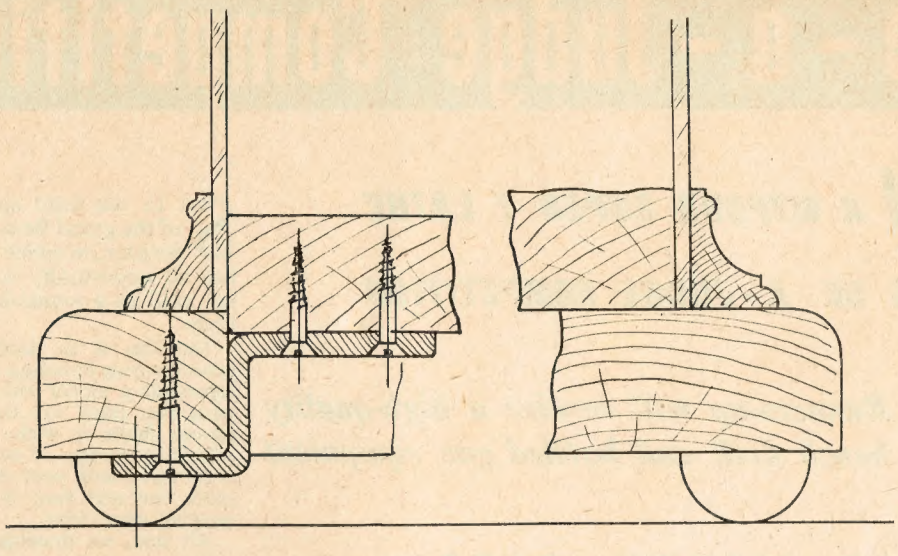


FIG. 54 FIG. 55

Fig. 54: *Case with removable floor.* *Fig.* 55: *Sealed case with fixed floor*

pillars and screws already prepared. The projecting ends of the brass strips can be screwed to the base frame, thus holding the baseboard in position. Rubber pads are screwed to the underside of the base frame to lift it clear of the brass strips, and to prevent it from damaging any polished surface on which it may be laid.

Other ship modellers prefer to make the case with a fixed base so that it is hermetically sealed (see Fig. 55). I have made cases in this way and, considering everything, I think it is the more satisfactory method. With a sealed case, care must be taken to see that all adhesives and paint on the model have had time to dry out thoroughly before the model is inserted. Given this proviso, the model should last indefinitely without losing its pristine freshness of colour or condition.

I know one model which is as fresh as ever after 300 years. Its owner told me it had never been out of its case. It is a contemporary hull model of a Stuart ship, richly gilded and decorated, and is one of the most beautiful models I have ever seen.

Fig. 55 shows the construction of the sealed case. The base can be a frame or, if preferred, a single piece of wood about $\frac{3}{4}$ in. thick, and the sea (or baseboard if the model is full-hulled) should be screwed down to it from below, and located exactly central with the sides and ends. Pin and glue the moulding in place, with the glass in position but not glued, so that it can be inserted later in the space *without strain*. Here is a word of warning: if the glass is put into position under strain in any direction, it will crack sooner or later owing to varying atmospheric conditions and temperatures.

Corners

The glass used for picture framing is suitable for a case of the size that we are considering. It must be free from blemishes and must be cut with square edges and accurately to size. I once had to have the glass ground to size, but this is not necessary if the glass is cut carefully. The ends can overlap the sides or *vice versa* provided that the interior dimensions are correct for the baseboard. Each piece must be of equal width so that the top piece lies firmly without rocking. For the corners I have used *passe partout* with success, but I consider that the larger of the two cases is about the biggest that one can bind with *passe partout*. For a larger case, brass angle is to be preferred. It involves mitring and silver soldering the corners as in Fig. 56, and it makes a very neat, strong case.

Some cases are framed in wood,

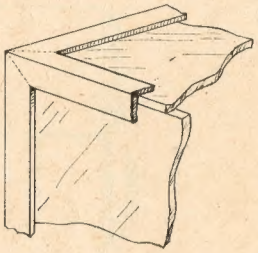


FIG. 56 FIG. 57

Fig. 56: *This case has brass angles*
Fig. 57: Passe partout *on its corners*

but I have no experience of making them. Donald McNarry uses a wood which harmonises with the colour scheme of the model. His cases are handsome examples of craftsmanship, and greatly enhance the model's value. You will find that his book *Shipbuilding in Miniature* (PM, 12s. 6d.), contains valuable hints on making cases for ship models and is worth careful study. But for either of the two models which I described, *passe partout* would be satisfactory. For the larger of them, two layers of *passe partout* could be applied to give additional strength. In any event, you should use adhesive extra to that already on the material. A narrow strip of linen tape could be glued in

● *Continued on page 593*

Be-a-Judge Competition

WIN A MYFORD SUPER 7 LATHE

IN THIS BE-A-JUDGE COMPETITION

Runners-up will receive a high-quality bench drill and bottled gas equipment

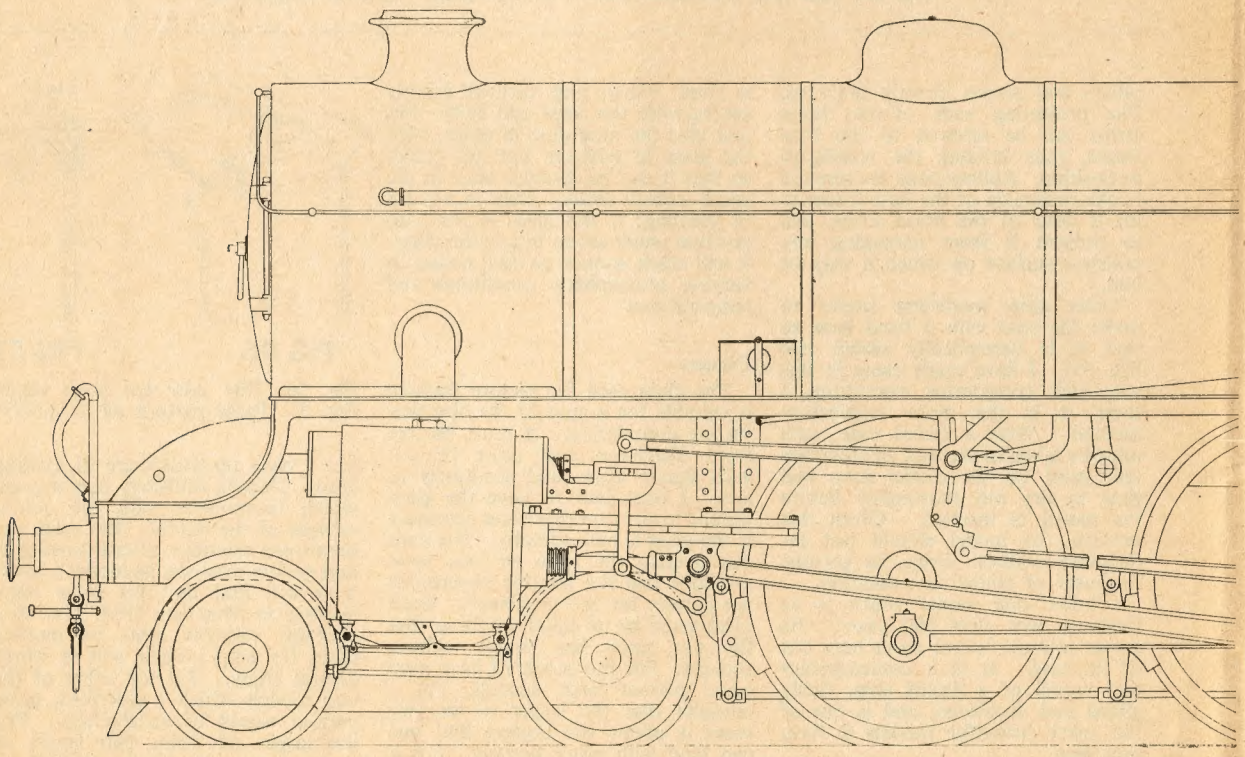
PRIZES WORTH £150

So to the third and final part of the grand Be-a-Judge Competition, in which every reader has an opportunity to test his or her skill as a would-be exhibition judge.

The idea is to decide from the accompanying drawings, each of which represents a model with eight faults, what you think are the four most serious faults in each. Place your selections in order of importance and enter them, with your decisions from parts one and two, in the accompanying entry form.

All told, six drawings, each con-

Continued on 576



1. Chimney wrong shape.

2. One handle missing from smokebox door.

3. Snifting valve missing.

4. One safety valve missing.

5. Lifting arm for radius rod omitted.

6. Rainstrip on cab roof missing.

7. Combination lever too short.

8. No oilbox on big end of connecting rod.

ENTRY FORM—1

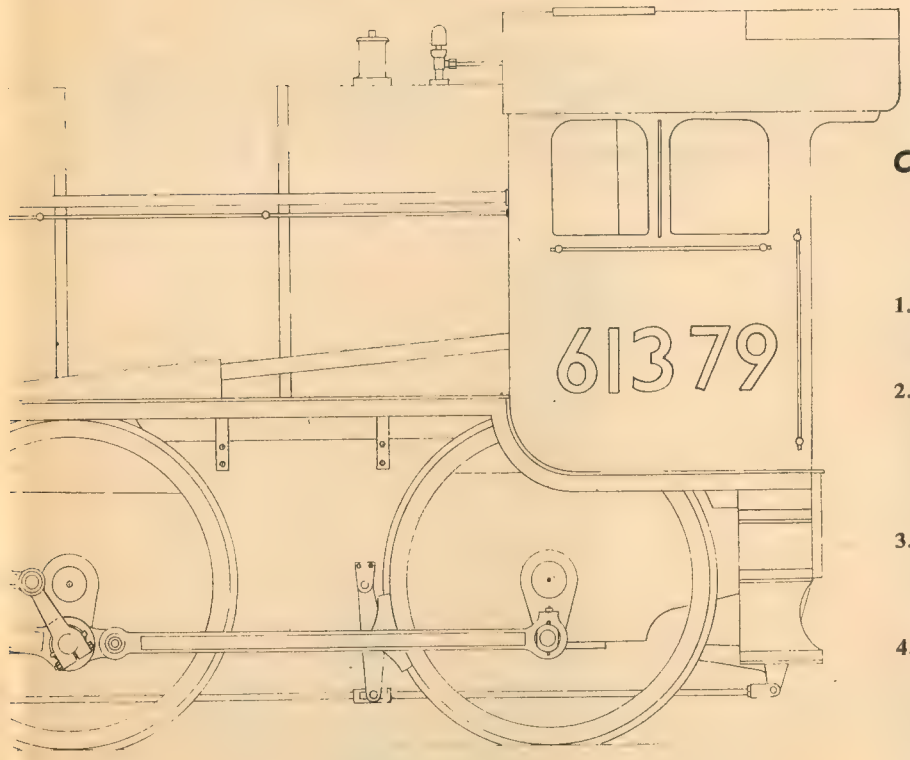
		A 1st fault	B 2nd fault	C 3rd fault	D 4th fault
APRIL 27	Jubilee				
	Cutty Sark				
MAY 4	Allchin TE engine				
	Moorcock				
MAY 11	ME Beam engine				
	Springbok				

BLOCK LETTERS PLEASE: Name .....

Address .....

.....

I agree to the conditions (Signed).....



TO ENTER the Be-a-Judge Competion, complete the entry form below in the following manner.

Having decided what you think are the four most serious errors in the model of Jubilee, place them in order of importance, putting the most serious of the four in column A and the least serious in column D. You need not describe the fault; just enter its appropriate number. For example, if you think that the omission of the guard iron on Jubilee is the most serious error, then put its number, 7, in column A.

Complete the remainder of the form for the other models in this fashion, add your name, address and signature, and post your entry to Model Engineer, Competiton, 19-20 Noel Street, London W1, to arrive not later than first post Monday, 5 June 1961.

Send to :

Model Engineer

Competition

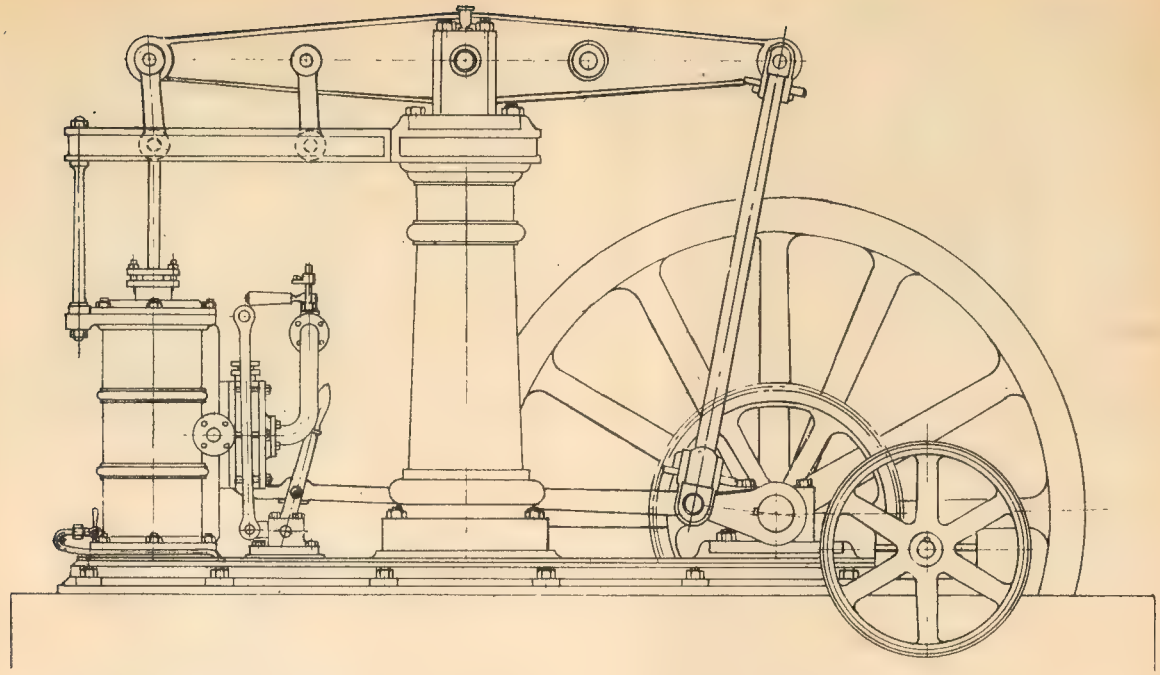
19-20 Noel Street

London, W.1

Closing date 5 June 1961

CONDITIONS OF ENTRY

1. A panel of judges appointed by the Editor will decide the order of seriousness of the faults.
2. All coupons will be scrutinised so that no claim will be necessary. Proof of posting will not be accepted as proof of delivery. No responsibility can be accepted for entries which are lost, delayed, or damaged.
3. Employees and the relatives of employees of Percival Marshall and associated companies are not eligible to compete.
4. Any question arising out of, or in connection with, the Be-a-Judge Competition will be decided by the judges and their decision is final. No correspondence can be entered into.
5. Mutilated or altered entry forms will be disqualified.
6. Closing date is first post on Monday, 5 June 1961.

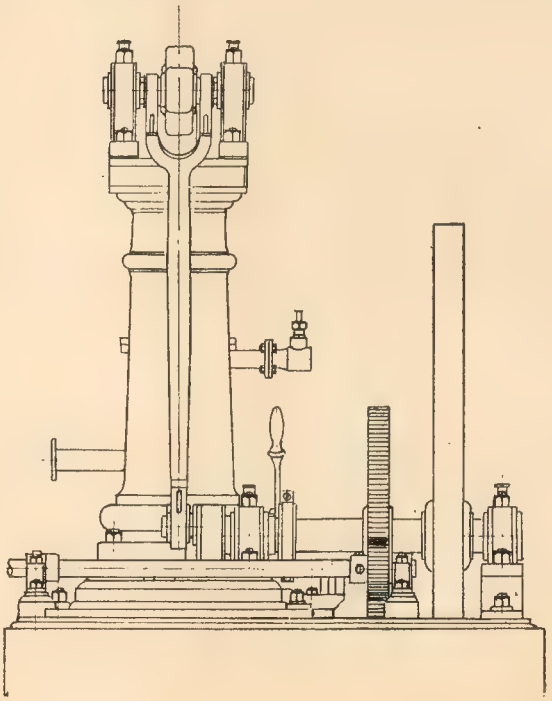


taining eight faults, have now been published. The first two, on April 27, were of *Cutty Sark* and *Jubilee*. These were followed on May 4 by *Moorcock* and the *Allchin* traction engine. Today's are of *Springbok* (the 5 in. gauge tender locomotive designed, built and described by Martin Evans) and the ME Beam Engine.

A panel of judges, representing the relevant branches of model engineering, will be set up by the Editor. The competitor whose entry agrees with, or most closely approximates to, their verdict will be the winner of the Myford Super 7. The next nearest will be awarded the ½ in. Fobco bench drill, and the two runners-up will receive boxes of Carrigas bottled-gas equipment.

Entry is free. Any number of entries may be submitted provided that they are on the official form printed in MODEL ENGINEER.

1. Incorrect type of connecting rod.
2. Shape of the beam is wrong.
3. The governor has been omitted.
4. The pump has been forgotten.
5. The flywheel has the wrong number of spokes.
6. Design of parallel motion is wrong.
7. Valve crank lever is the wrong size.
8. Eccentric rod is too heavy.



IF YOU MISSED PARTS ONE AND TWO WRITE TO THE BACK NUMBERS DEPARTMENT, PERCIVAL MARSHALL LTD, 19-20 NOEL STREET, LONDON W1, SENDING 1s. 10d. FOR THE ENLARGED APRIL 27 NUMBER AND 1s. 4d. FOR THE MAY 4. PRICES INCLUDE POSTAGE.

WORKSHOP HINTS and TIPS

HOLDING and INDEXING CHUCKS

By GEOMETER

WHEN a lathe is the only major machine tool in a workshop, there are often times when it must function in ways other than those originally intended. This is particularly so in model engineering with the workshop built around the lathe. Certain types of milling, planing, grinding, lapping, indexing, and so forth, have all to be done on the lathe in the absence of specialised machines or equipment.

Many non-standard operations, based on milling or boring machine practice, are performed with a cutter or tool rotating in a chuck or holder, working on a component mounted on a slide or saddle. All told, they form an extensive and varied group, which greatly extends the scope of the lathe.

A further spread of operations follows when components (on which turning operations have perhaps already been performed) are held stationary in the chuck or on the faceplate or angleplate for machining or grinding with slide-mounted heads or attachments.

Locking devices

For this group of operations, the chuck or faceplate must be held firmly —often in some particular angular relationship with features already finished; accurate resetting or indexing is frequently required. Examples are found in machining keyways, teeth of gears, the tangential flanks of cams, and other angular flats. Even for certain filing operations on the lathe, it can be an advantage to have the chuck firmly held against rotation.

On a flat-bed lathe, a simple way of securing the chuck is as at *A*. A piece of suitable angle-iron or rectangular-section steel, bent at right-angles, is drilled through one flat for bolting to the bed, and through the other for attaching a clamping plate by a bolt. Packing pieces can be interposed to the jaw of the chuck; and if they are rounded at the jaw ends, and the angle piece has a slotted hole for sliding across the bed, a small amount of rotational movement is possible for the final adjustment of work in the chuck.

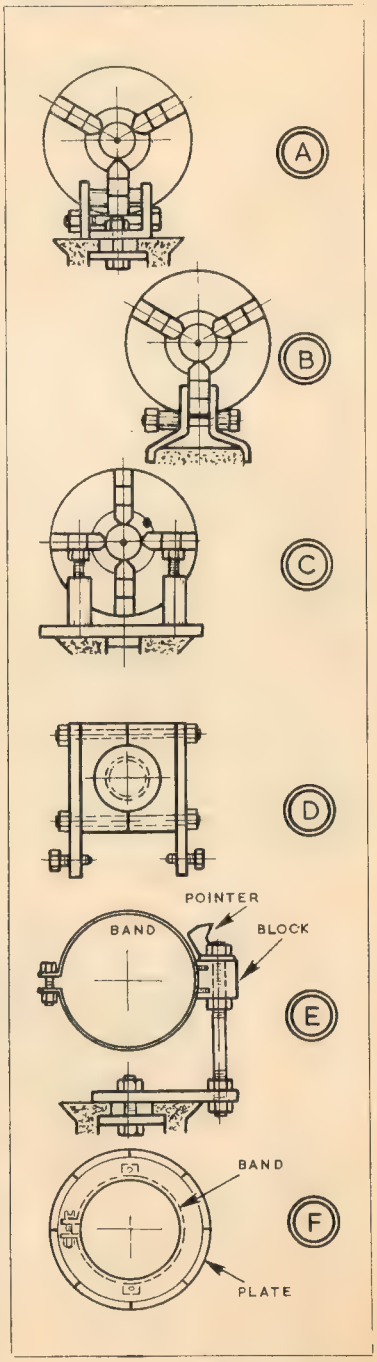
On a gap-bed lathe, a way of securing the chuck is as at *B*. Two pieces of rectangular steel are each bent to extend from the jaw to the bed. Then they are drilled for a clamping bolt, which can be fitted with distance pieces if clearance is restricted. The material can be bent in an old vice, or on a small anvil if the section is heavy and must be heated to red. With a heavy section, each piece can be drilled and tapped at the lower end for a screw to the bed to permit angular adjustment.

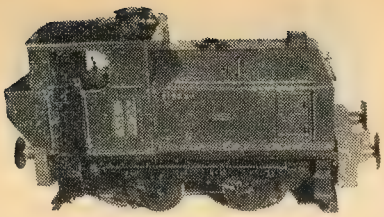
Both ways of holding a chuck apply whether it is a three-jaw or four-jaw, and so admit of three or four basic settings—with, of course, a check on work from a square or surface gauge on the bed. For holding a four-jaw chuck on a flat-bed lathe, an alternative way is as at *C*, with a pair of jacks on a flat plate. Four basic settings can be made, with delicate final adjustment; but care is needed to avoid slightly jacking the chuck if this would be detrimental to accuracy.

When a chuck cannot be held by its jaws, or a faceplate must be secured, a clamp, *D*, can sometimes be used on the boss of the backplate or faceplate. Two aluminium blocks can be easily faced, drilled and bored, and two flat bars bolted up with an adjusting screw in each.

Either a three-jaw or four-jaw chuck can be held behind its key sockets by a band which can be anchored to the bed of the lathe, *E*. A bar, clamped to the bed, mounts a long stud through a block attached to the band by countersunk screws —or by silver-soldering or brazing. Thus fine settings can be made.

For indexing from an initial setting, an index plate, *F*, can be made from sheet steel or iron to rivet to a band clamped to the flange of the chuck backplate. Then the stud of the holding device can be provided with a pointer. Dividing of the index plate can be done in any of several ways; for turning it and cutting out its centre, it can be clamped to a plywood backing on the faceplate. ▣





BUSY WITH THE BOILER FITTINGS

For the water gauge J. J. CONSTABLE recommends a special glass which he has found to be ideal. This is the seventh instalment of his serial on the Sentinel industrial engine in 5 in. gauge

MAKING the regulator in Fig. 39 from a piece of bronze, I dealt first with the ball seat. The block was held in the four-jaw chuck, and at $\frac{3}{16}$ in. from the top a 5/32 in. dia. hole was drilled to a depth of $\frac{9}{16}$ in. This was followed with a 7/32 in. dia. end-mill to $\frac{9}{16}$ in. depth. The hole was tapped $\frac{1}{4}$ in. × 40 for $\frac{3}{16}$ in.

Before I removed the block from the chuck, I put a $\frac{1}{16}$ in. drill right through it to give the centre mark for the boss to be turned at the other end. The block was turned round and the $\frac{3}{8}$ in. dia. boss was turned and threaded internally 9/32 in. × 40 for $\frac{1}{4}$ in. Then I drilled the connecting passages 5/32 in. and made two small plugs to be silver soldered into place. The two holes for the inlet and outlet were drilled in the vertical slide set over to the correct angle and the height was adjusted to line up with the 5/32 in. holes already drilled.

While the angles shown are not critical, it will be seen from Photograph 15 in my last instalment that the correct angles will help the connection of the pipes to the main steam stand and superheater. Although the nipples only require a bare $\frac{1}{4}$ in. of 9/32 in. × 40 thread, the overall length will be about $\frac{1}{2}$ in. to allow seating in the body for silver soldering. It will be noticed that two holes (hatched in the drawing) have to be plugged after all the passages have been drilled.

You may find it easier to thread them $\frac{3}{16}$ in. × 40, screw in a short stub of rod, cut off nearly flush, and then silver solder. All the silver soldering should, of course, be done at the same heat. To hold the $\frac{3}{16}$ in. dia. ball a stainless steel spring should be made up as shown. Bronze spring will also do, and stainless steel springs can be had from ME advertisers.

The blower and exhaust pipes are connected to the fitting in Fig. 40. It is made from a block of brass. The $\frac{3}{16}$ in. dia. hole is drilled first and the end is turned down and threaded 9/32 in. × 40 for $\frac{1}{2}$ in. Then the hole to take the exhaust nipple is drilled 5/32 in. right through to the $\frac{3}{8}$ in. passage and tapped $\frac{9}{16}$ in. × 40. At 7/32 in. away from its centre drill down a $\frac{1}{8}$ in. dia. hole for a bare 3/32 in. and tap it 5/32 in. × 40. A $\frac{1}{16}$ in. hole drilled from the side connects with it, and it should be slightly counterbored to take the 5/32 in. × 40 nipple for the blower pipe. The length of the nipple should not exceed $\frac{1}{8}$ in. or it will not be possible to screw the fitting into the smokebox.

Nipples for the exhaust and blower are made from hexagon rod of the sizes shown. As the exhaust nipple should be central in the chimney for maximum steaming efficiency, you are advised to screw the completed fitting into place, and to fit the exhaust nipple, and put a 3/32 in. dia. rod temporarily into it.

Place the smokebox door and the chimney into position and check that the rod is central in the chimney. If it is, the two securing holes in the angles riveted to the smokebox cover can now be marked as I have said; the chimney will always be in the right position when it is secured with the studs.

The water gauge and fittings in Fig. 41 are somewhat different to those normally found on small locomotives.

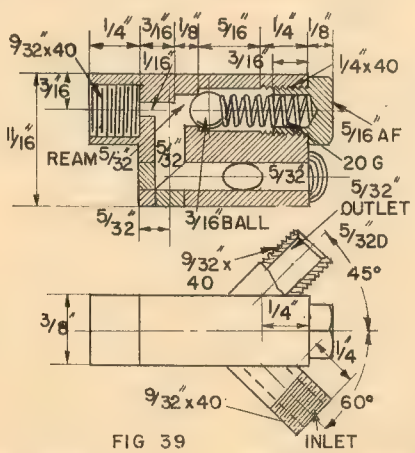


FIG 39

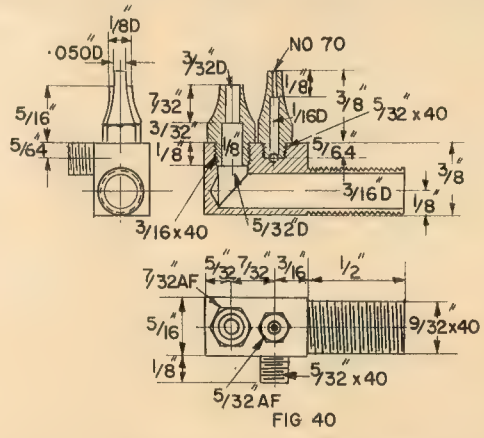
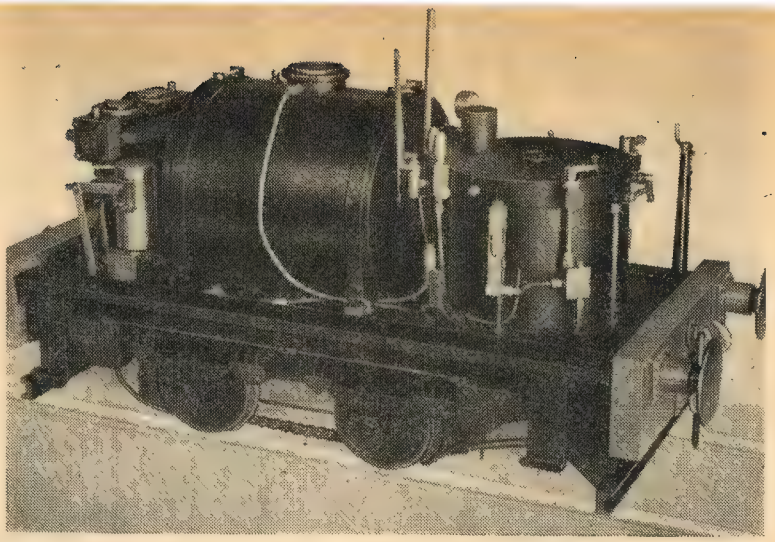
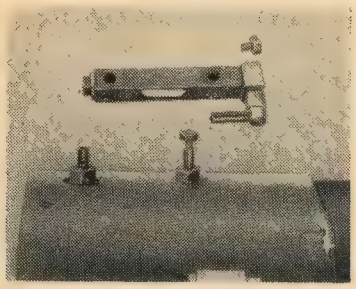


FIG 40

You can make the more usual type if you wish; I have shown the one fitted to the model. From Photograph 18 you will get a fair impression of the fitting which shows the water level in the boiler. While the fitting calls for careful work, it is not difficult to make and has proved satisfactory. The body is made from $\frac{5}{16}$ in. square brass and should be drilled right through to take the gauge of glass to be used. The largest glass that can be accommodated is about $\frac{3}{16}$ in. dia. Before drilling, measure the glass with a micrometer and drill the block three thou oversize. I used the special glass sold by an ME advertiser. It has a white background with a blue line and is ideal, as the water magnifies



Photograph 18: *Nearside of locomotive without any of the superstructure*



Photograph 19: " *Water magnifies the line.*" *Gauge with the boiler mountings*

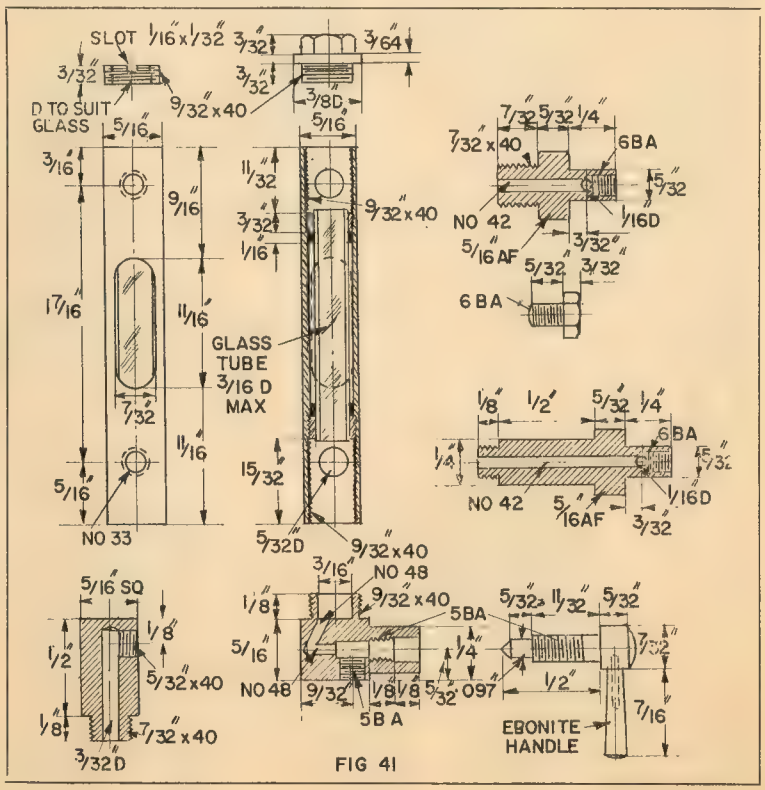
the line and the level can easily be seen. Some of the glass I have found rather oval; be careful in measuring and discard any glass of more than 5 thou ovalness or the rubber packing rings will squeeze through.

Holes in the rubber clamping ferrules should, of course, also be the same size as the hole in the body. It is important that the threads are a nice fit in the threaded body. If the threads are a loose fit, it is a safe bet that the glass will be cracked on assembly. The rubber rings are made from a piece of surgical tube which I find is quite pliable and stands up well to the sterilising heat of the water. They can be easily cut by putting the tube on a piece of rod, revolving it in the lathe and parting off to the right thickness with a wetted razor blade. The seats for the rubber rings in the body should be made good and square with a $\frac{1}{4}$ in. end-mill. Do not mill the 7/32 in. wide slot in the body on the side which will adjoin the boiler.

It will be noticed that the fittings, made from 2 BA hexagon rod, differ in length. The shorter one screws into the boiler bush; while the longer is the top one which goes through the smokebox and screws into the stand.

The stand is screwed into the boiler crown in the position which in Photograph 15 of my last instalment is occupied with the steam outlet to injector and blower. I intended to take steam to both these valves and to connect up the top of the water gauge to the same point. But when the injector steam valve was opened, the water in the gauge glass promptly disappeared—which is why the drawings are slightly different from the photograph. It will be noticed that I have put a separate stand just behind the by-pass handle; I have detailed a separate stand for the water gauge and another for the steam to the injector and so forth.

Make the water gauge stand from $\frac{5}{16}$ in. sq. brass; the position for the 5/32 in. × 40 hole must be decided with the stand screwed into position. First, the position of the hole to be tapped 7/32 in. × 40 in the boiler



crown should be decided. Screw the short fitting into the boiler bush, place the top fitting in the gauge, and secure lightly with the 5 BA stud. Place the gauge in line with the bottom fitting, drill the copper above the crown of the boiler, and file an oval in the smokebox to allow the top fitting to enter above the boiler crown. When it goes through, the gauge is placed on the bottom fitting and is secured lightly with the other 5 BA stud.

Making sure that the gauge is vertical in both directions, you can mark the boiler crown for drilling and tapping. The gauge is removed and the stand screwed into position. Take care that one of the faces is square with the top fitting when the gauge is again offered up. With a No. 42 drill put through the fitting, a mark can be made on the stand and the hole can be drilled and tapped 5/32 in. × 40.

I have gone through the process of marking out the holes in the stand and the boiler crown in some detail. All that remains to be made for the gauge glass is the top cap and the blow-down valve. They are fully detailed and need little comment.

The blow-down valve was made in one piece from a block of bronze or brass. After having been drilled nearly right through with a No 48, followed for $\frac{7}{16}$ in. with No 36, it was tapped 5 BA and counterbored for $\frac{1}{8}$ in. with a drill of $\frac{1}{4}$ in. dia., and the outside was then turned to the shape shown. It was again set up in the four-jaw chuck to turn the 9/32 in. × 40 shoulder which screws into the gauge body.

At the same setting it should be counterbored with a $\frac{3}{16}$ in. dia. end-mill to facilitate drilling the No 48 hole to break into the one drilled earlier. This is done in a vice on the drilling table where it is possible to sight the drill. The stainless steel valve should have a snug thread; no packing is needed as when it is open to outlet there is little pressure against the stem.

Before screwing in the short stub of 8 BA rod to take the fibre handle, make sure that in the vertical position of the handle the valve is shut. If the valve does not screw up to position in the gauge body, a slight skim should be taken off the body—in the lathe to ensure that the cut is square with it. You will have appreciated by now that the gauge walls are very thin and can easily be distorted by undue pressure.

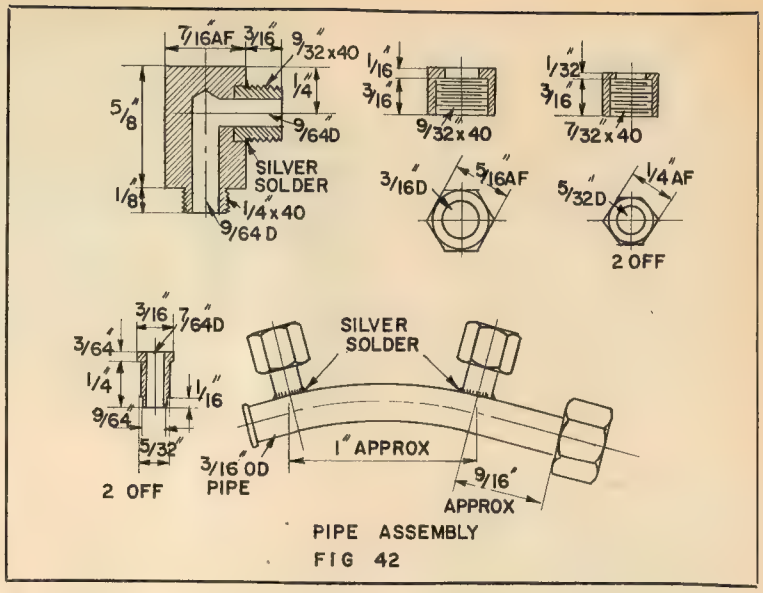
Photograph 19 shows a close up of the gauge fittings in the boiler and also of the gauge itself. When it is mounted permanently, do not forget to place a small paper washer (oiled) between the gauge body and the boiler fittings.

Details of the steam turret and stand for the injector and blower valves are in Fig. 42. The stand should be screwed into the boiler crown on the by-pass line in Fig. 13. It should be located on this line about $\frac{1}{2}$ in. away from the smokebox or it cannot be screwed into position as the nipple will be in the way when the fitting is screwed in.

A 2 in. length of $\frac{3}{16}$ in. o.d. copper pipe should have a copper nipple fitted at one end. An easy way to make the nipple is to hold a length of thick walled copper pipe in the chuck, drill down with a $\frac{3}{16}$ in. drill for just over $\frac{1}{8}$ in., and part off to an overall width of $\frac{1}{16}$ in. The barest amount of pipe should protrude from the chuck jaws. The ideal parting blade is a piece of a high-speed hacksaw blade, dead sharp; I grind mine so that the contour of the grinding wheel provides the clearance. I often use the blade for small boiler fittings; it is surprising how much brass can be wasted by using thick blades.

The nipple is silver soldered to the end of the pipe with the barest amount of silver solder, and the 2 BA hex. gland nut is made as shown. The location of other fittings for the pipe cannot be decided until it is placed in position on the stand. With the injector and blower valves in position without the valve stems, the pipe should be carefully bent to the approximate position shown. By

● *Continued on page 593*



PIPE ASSEMBLY
FIG 42

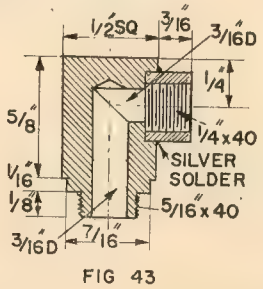


FIG 43

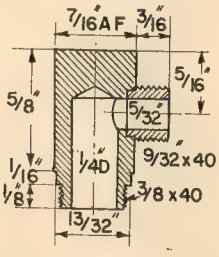
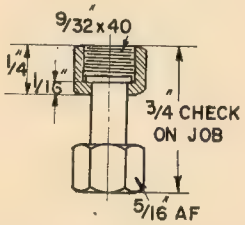
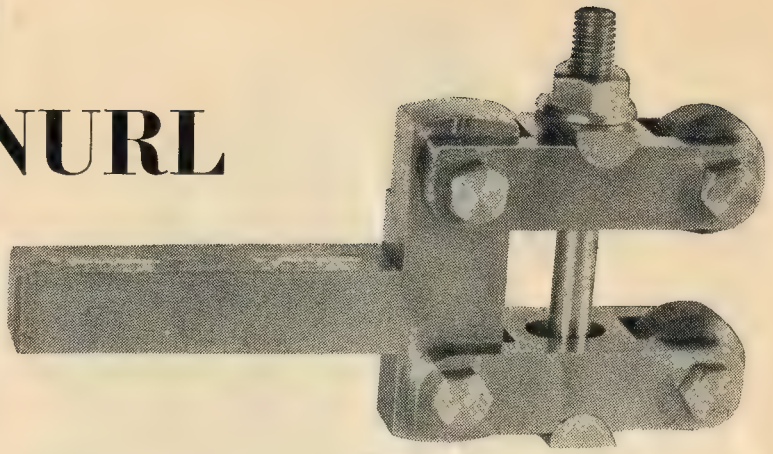


FIG 44



FOR THE SCHOOLS

HOW TO KNURL



N. F. HALLOWS BEGINS ANOTHER SHORT SERIAL

WHEN mechanical work is examined, the finish of knurled components can hardly escape notice, and faulty workmanship may be revealed. Clear-cut, well-defined knurling, discreetly applied, gives the work an attractive look; poorly finished knurling can be an eyesore.

My knurling method has given uniformly good results over a period of many years. The tools needed are a selection of knurling wheels and a holder suitable for mounting in the lathe toolpost.

In commercial practice, where large robust machines are used, the knurls can be forced into the work with a plunging cut, or a cut which combines plunging and traversing, without causing excessive loading of the spindle bearings. But knurling operations conducted in this way are liable to put too great a strain on the mandrel bearings of the lighter lathe generally used in small workshops. Instead of employing a plunging cut or traversing the unsupported knurls we, therefore, neutralise the radial pressure on the mandrel bearings by applying the two knurling wheels at diametrically opposite points on the work.

With this arrangement, one knurl acts as a steady for its opposite fellow, and the work required of the lathe is restricted almost entirely to overcoming the rotational resistance.

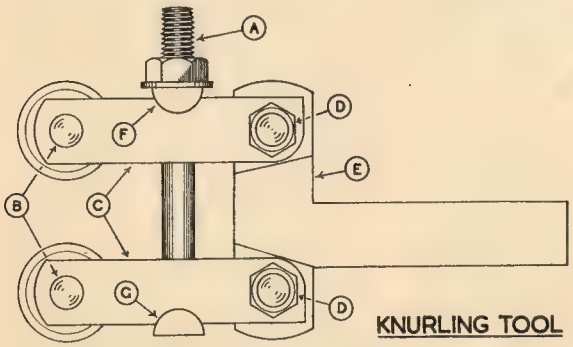
A further advantage of a tool holding the knurls in this way is that it makes possible the knurling of slender material which would not be sufficiently rigid to withstand a plunging cut. For example, oil-way plugs turned from $\frac{3}{16}$ in. dia. steel and duralumin rod have been knurled without difficulty.

I must emphasise that knurling is not a gear-cutting process in any way dependent on the relationship between the diameter of the work and the pitch of the knurl teeth; it is a rolling and swaging action which at the same time allows the knurls to keep in step while they deeply indent the surface of the work. The rolling action produces a slight increase of the diameter of the work, and this may be used to provide a force fit for holding components permanently in place.

The knurling wheel holder, of $1\frac{1}{2}$ in. capacity, consists of a body which has a shank for gripping in the lathe toolpost and a head part to which two forked arms for carrying the knurling wheels are pivoted. The body was cut to shape from a length of 2 in. × $\frac{1}{2}$ in. mild-steel stock to the dimensions which are given in the drawing for a lathe of $3\frac{1}{2}$ in. centre height.

It is important to file or machine the under surface of the shank truly flat and square so as to provide a level clamping surface that also aligns the head of the tool exactly vertical. In addition, the mid-point between the two arm pivot centres should correspond with the lathe centre line when the tool is secured in place.

By micrometer measurement the head was recessed to a finished thickness of exactly $\frac{3}{8}$ in. for mounting the two arms; the work was carried out in the shaping machine with the machine vice set over successively to



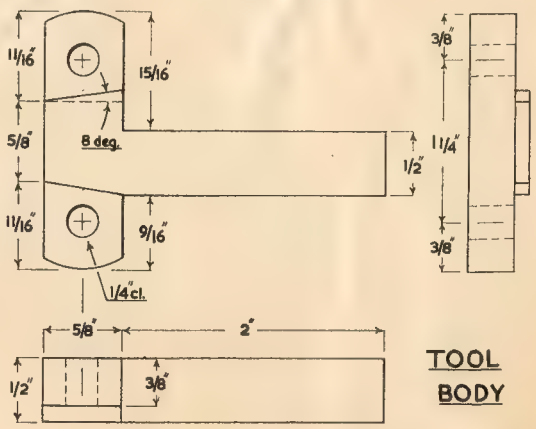


Fig. 2: A adjusting screw; B wheel pivot screws; C upper and lower forked arms; D arm pivot bolts; E tool body; F and G loose and fixed pressure pads

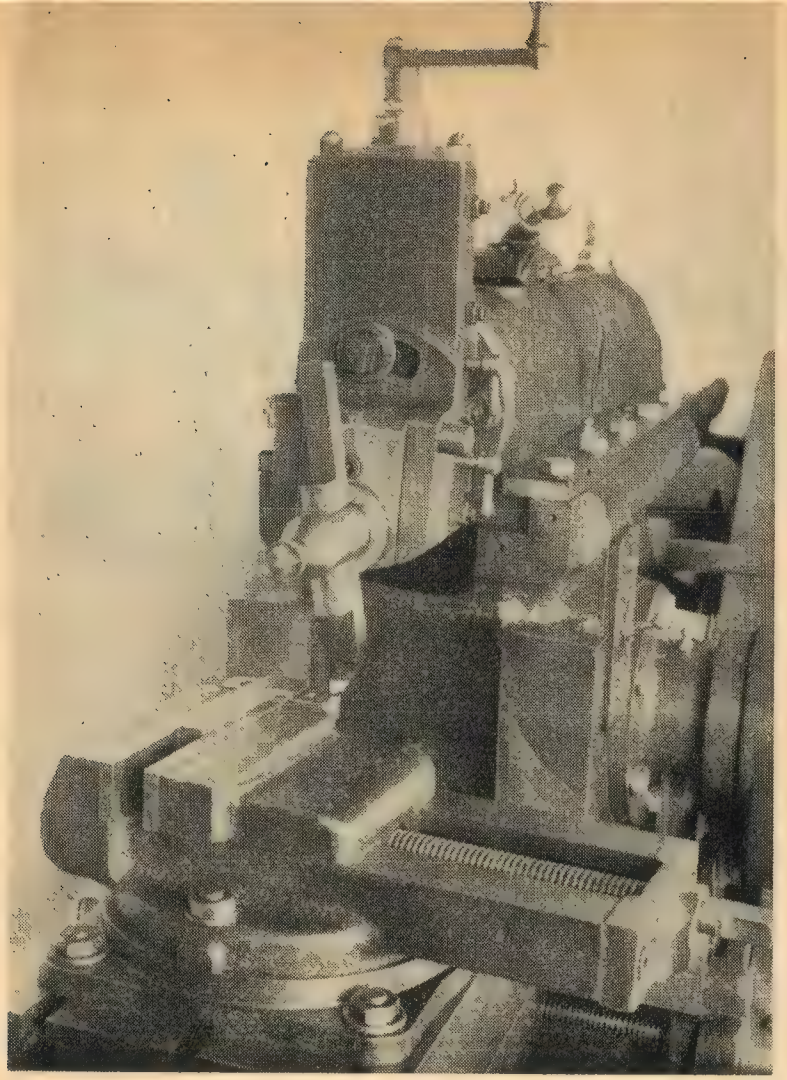


Fig. 4: Recessing the head of the tool in the shaping machine

8 deg. on either side of the zero mark. I took care to leave a good surface finish by using a fine feed and a sharp tool, so that no subsequent filing was needed.

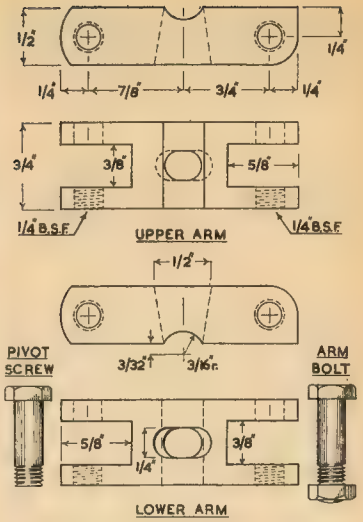
The machining can be carried out equally well in the vertical milling machine, or in the lathe by mounting the work on the swivelling vertical slide and forming the recesses with an end-mill.

To complete the machining, the two clearing-size holes were drilled in the tool head for the $\frac{1}{4}$ in. dia. arm pivot bolts. The body was cleaned up with a fine file and, for the sake of appearance, the upper and lower surfaces of the head were formed to a radius. Although it is customary to case-harden tools of this kind, I preferred to let the tool head be hand-scraped afterwards to a close fit for the two case-hardened wheel arms.

The two forked arms that carry the knurls were made from $\frac{5}{8}$ in. × $\frac{1}{2}$ in. mild-steel stock. After marking out the work and cutting it to length, I drilled and tapped the screw and bolt holes in accordance with the working drawing, Fig. 5. Note that the arms are similar in all respects, except that the clearing-size and tapped holes are on opposite sides.

For slotting the arms at either end, the surplus metal was first removed by sawing down to meet a drill hole formed at the bottom of the fork. After each arm had been secured in the lathe toolpost at centre height, as in Fig. 6, the abutment faces of the slots were brought to a good finish and the forks were machined to size by a fly-cutter—a cutter-bit, in the form of a parting tool, mounted in a boring bar held in the chuck and supported at its outer end by the tailstock centre.

To avoid chatter when you are



machining the bottom face of the slot, you can grind back the centre portion of the tool's front cutting edge to reduce its area of contact with the work, as advocated by Mr Westbury in machining crank-pins. The two arms are fitted individually to the tool head, and so they, as well as the body, should be marked with hand stamps to ensure correct location when the tool is finally assembled.

If you have no inside micrometer for the fitting operation, you can accurately measure the width of the slots by inserting either a taper gauge or a standard $\frac{3}{8}$ in. taper mandrel. By this means, the finished width can be made exactly $\frac{3}{8}$ in. to form a tight fit on the tool head. As shown in Fig. 5, the arms are provided with recesses to form curved abutment faces for the upper and lower pressure pads mounted on the adjusting screw. The recesses can be formed by end-milling operations in the lathe.

My own method was different. As represented in Fig. 7, a strip of $\frac{1}{2}$ in. × $\frac{3}{16}$ in. mild steel, centre-drilled at a marked-out centre, was gripped in the machine vice with the scribed centre lines of the adjusting screw passage holes in alignment with the centre line of the spacing strip.

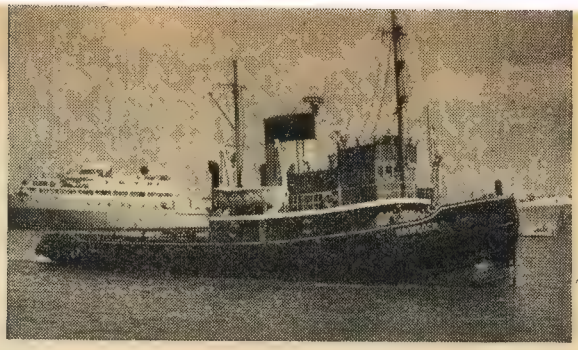
After a small pilot hole had been put through, the two recesses were finished to the correct depth and radius with a $\frac{3}{8}$ in. dia. drill. The clearing-size holes for the passage of the adjusting screw were drilled and afterwards opened out with a round file to allow the arms to open and close to the full extent. In addition, the ends of the arms were finished to a radius. Although the forked arms were finally case-hardened, I deferred this until after the tool had been fitted and assembled.

★ *To be continued on May 25*

Modelling the tug MOORCOCK

Continued from 13 April 1961, pages 456 to 458

By OLIVER SMITH



READY for the LAUNCHING

ASSUMING that your model has progressed as far as the last instalment, it will now be nearing the final stages of completion. Some of you may feel that this is not quite true; perhaps your model looks far from complete because you have not yet fitted the masts. It is surprising the difference which masts make to a model. Even when it is on the drawing board, it does not look properly dressed until the masts and rigging have been added.

On *Moorcock* there are two masts, the main and fore, and both are made from steel. There is an interesting feature of their construction which is only evident on a close examination—they do not have that continuous graceful taper which is generally associated with a ship's mast. They may seem to have it from a distance, but in fact they are stepped down in diameter from the base to the cross-trees. There are two steps. They give the impression that they have been made by telescoping one piece of tube inside another and then effecting a join.

From the cross-trees to the truck the top mast has a more pronounced taper which smartly adds the finishing touch to the complete mast. I have included an illustration which I hope will be clear enough for you to appreciate exactly what these sudden changes in the diameter of the masts are really like.

Fitted to the cross-trees, which are made of metal and are secured to the masts by metal bands, are the wireless aerial at each end and four halliards, two each side of the mast. In addition to these on the foremast are the two R/T antennae.

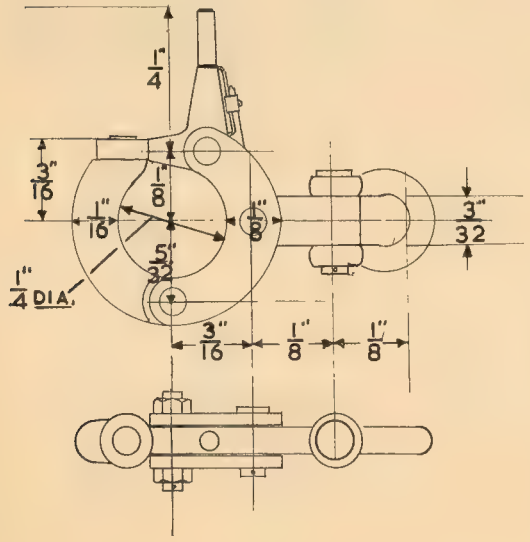
Other addition to the foremast are the three electric navigation lights, the siren and the ship's bell. The three lamps sit on a little platform or bracket welded to the mast, and similar fixings are provided for the bell and siren. You will see the position of all these fittings on the general arrangement drawing.

No doubt there are some readers who will want to know why three lights are fitted and when are they used. One light means that the tug is under way on her own, two lights mean that the tug has a normal tow in the river, and three lights signify that the tow is an exceptionally long one. The three are usually associated with deep sea towing.

I should mention that all electric navigational lights are duplicated by oil lamps in case of failure in the electricity supply. The oil lamps, too, are shown on the general arrangement drawing.

The base of each mast is simple and straightforward as you will see from the photograph. Its construction follows the general pattern of other items with which we have already dealt. Electric arc welding is used to fabricate it.

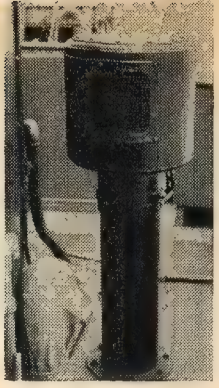
Both bases are almost identical with the exception of one of the strengthening webs on the foremast.



AN ME STAFF FEATURE

One of the two towing hooks. The pin at the bottom is preventing the hook from falling down as it would normally fall with the top lever in its backward position

BOLLARDS	BLACK
BULWARKS	BLACK OUTBOARD TEAK INBOARD
DECK	RED COMPOSITION
HANDRAILS	WHITE
WINDLASS	GREEN
FIRE-FIGHTING MONITOR	RED
TOWBEAMS	BLACK
LIFEBOAT	WHITE
DAVIT	WHITE

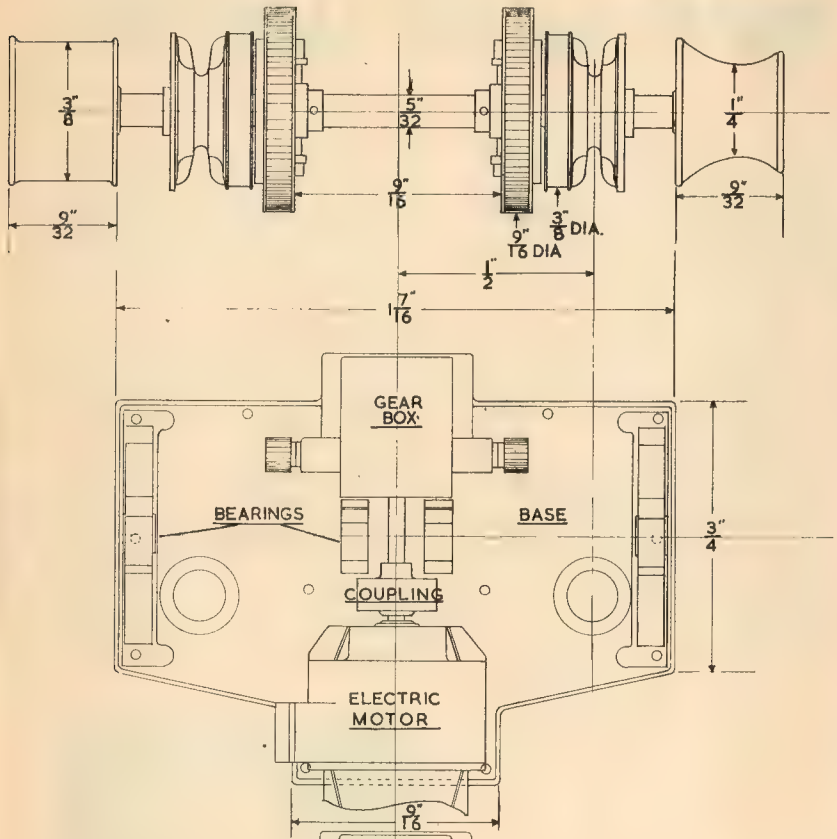


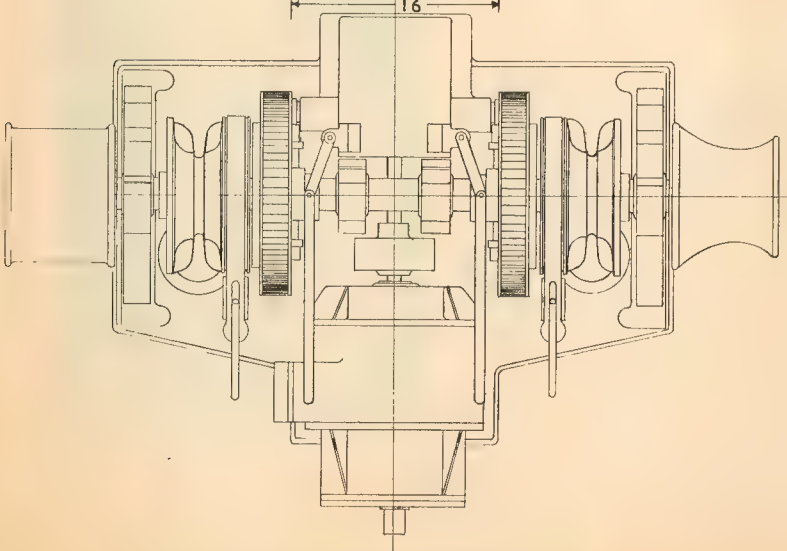
Mushroom ventilator on the boat deck at either side of the funnel

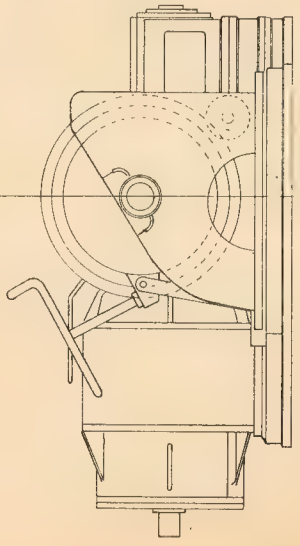
Instead of the four triangular-shaped plates the foremast has one rectangular plate fitted to the side facing the wheelhouse. It is welded to the front of the wheelhouse as in the illustration; it adds, of course, to the rigidity. As the fore mast is taller than the main mast, further support is provided by welding on the plate between the mast and the top of the wheelhouse just above the ship's bell.

I hope that this résumé has convinced you that the masts are not difficult to add to your model. There is no need to be rigid about the choice of material. Either wood or metal can be used. The important thing is the shape. When the masts are finished and have been given the final coat of paint, no one will be any the wiser as to what material is underneath.

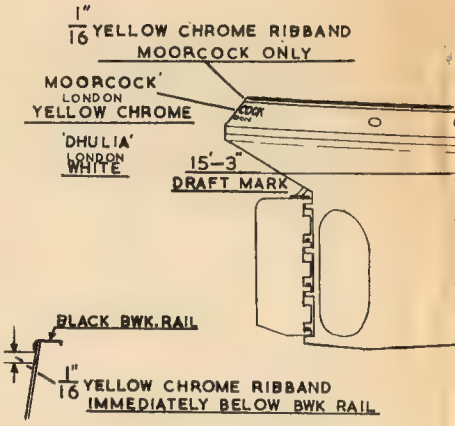
On the $\frac{1}{4}$ in. scale model the overall height of the foremast is 8 in. Those who are fortunate enough to have the use of a lathe can easily shape their masts from one piece of material particularly if it is wood. Those who are not so lucky need not despair.

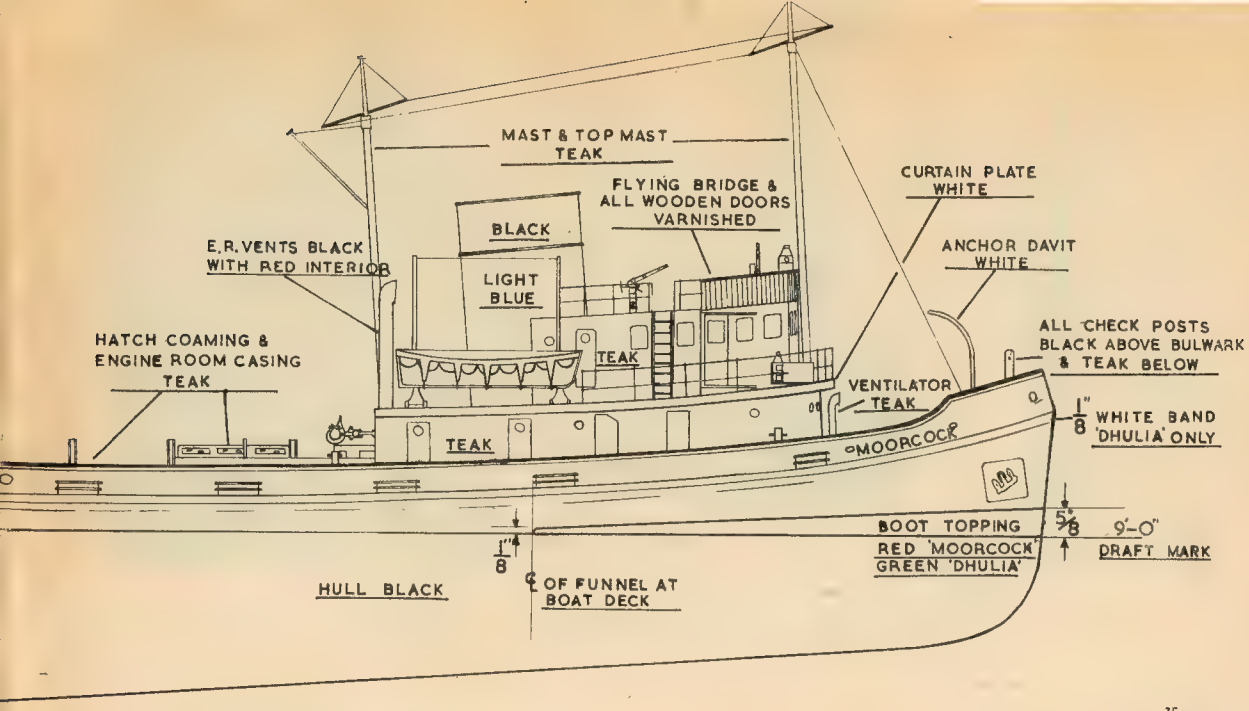


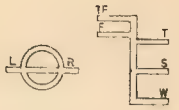




REIDS ELECTRIC ANCHOR WINDLASS







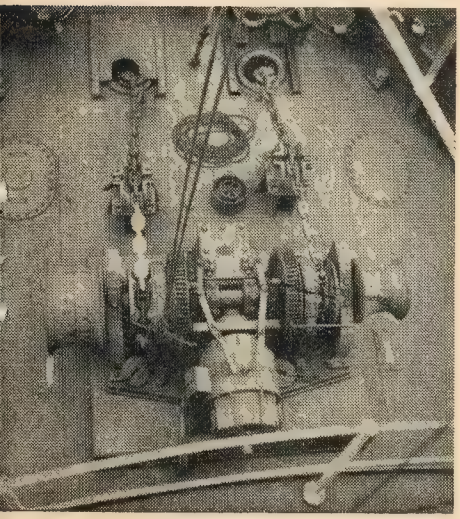
PLIMSOLL MARK

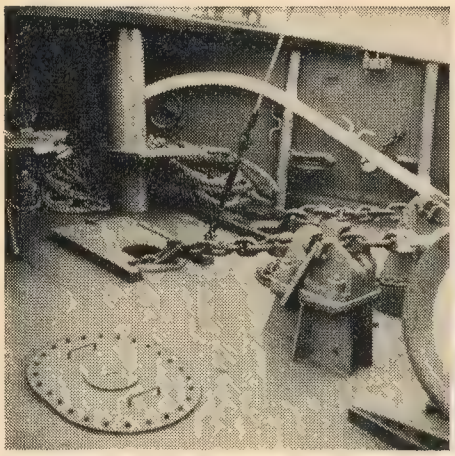
PAINTING ARRANGEMENT FOR MOORCOCK & DHULIA.

They can build the mast up from four separate pieces of rod, each piece a shade smaller than the one to which it is to be joined. If metal is preferred, a thin gauge brass or copper tube will be found most suitable.

To provide the same appearance as the full size mast, one piece of tube should telescope inside the other. The top mast will be easier to make from a solid piece of wood or meta tapered off to the truck. Where one piece of tube joins the other, run a small fillet of soft solder. Not only does this fix the tubes in position; it also makes the mast look almost the same as the full-size one. There are no sharp corners at the join—just a neat blend in from one diameter to the other.

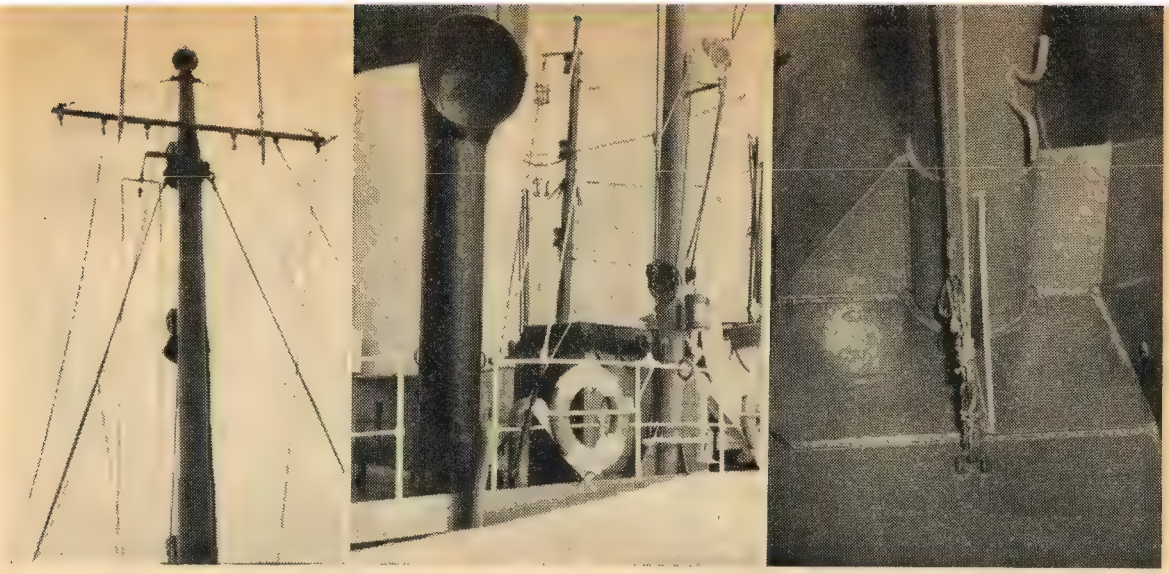
The bases are perfectly straightforward as can be seen in the illustrations. All dimensions shown are for the smaller model and should be increased accordingly for the ½ in. scale. Once again the materials can be either metal or wood, according to choice.



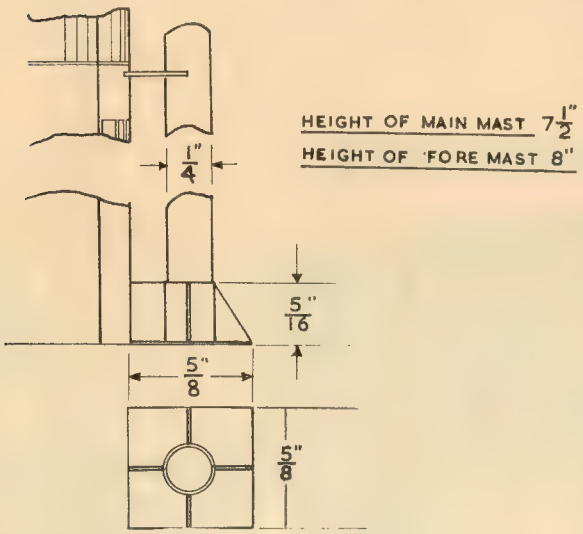


Above, left: Anchor chain stops are mounted on pedestals welded to the deck. The locking bar is hanging at the side. Above, right: The 11 b.h.p. electric motor of the windlass, and the switch gear against the front of the deckhouse

Left: Reid's electric-powered anchor windlass seen from the flying bridge. Note the three anchor chain links painted white, and their position with the anchor fully stowed



Left : Foremast. The two joins where the mast changes in diameter can be seen. Those two pole-like objects are part of the R/T equipment. Centre: Main mast on the boat deck. Its base is the same as that of the foremast. Other items of interest are the engine room ventilator on the port side, and the vegetable locker behind it. Right: Base of foremast showing web plate welded to wheelhouse



Base of the main mast. The axe rests in hook brackets for emergency use

After the masts have been completed, the next important piece of equipment to claim our attention is the electric windlass made by Reid's of Paisley. This, I feel, will prove more of a challenge to your skill. It is full of interest. My drawings are taken from those supplied to me by Reid's and I have parted the main shaft, together with gears and lifters from the base, so as to give a clearer picture of the windlass. I think that from the drawings a reasonable windlass can be built in wood, metal or a combination of both. Possibly the spur gearing may present some of you with a problem. It can be overcome with a little ingenuity by adapting small spur gears of the kind used in clocks, meters or other mechanisms of that type.

Our cable lifters are designed for stud link cable, and as our small windlass is not intended to work they can be fixed to the shaft. At full-size the cable lifters are independent of the shaft and are driven by engaging forged steel pins through the spur wheel. In the general arrangement drawing I have shown the levers which are used to engage this drive.

The fixing of the windlass is important because the windlass sits level with the base line. A special packing piece is made to fit the curve of the deck so that the windlass can be installed accordingly. It should not be fixed directly to the deck. Other details which should be included are the cable stoppers and the electric switch gear in front of the deckhouse.

Many modellers fail with the towing hooks. My drawing shows a hook for the $\frac{1}{4}$ in. scale model which will be in exact keeping with the real thing. While its size may bring it into the watch-making class for some of you, it is not really difficult. The main requirement is patience ! Remember, too, that towing hooks bear the brunt of the work and take quite a bashing. There is no need to fuss over them and make them look unrealistic with spit and polish. *Moorcock* is one of the most powerful

Continued on page 598

LIBRARY OF LOCOMOTIVES

An ME Staff feature

Masters of the West Hielant

By ROBIN ORCHARD

Continued from April 27, pages 527 and 528

ONE hundred miles of sheer battle: that is how enginemen describe the journey from Craigendoran to Fort William on the West Highland line, or the "West Hielant" as the locals call it. This is undoubtedly the greatest piece of railway engineering ever seen in Britain. How on earth the Victorians could have envisaged it remains a mystery.

What is so terrible about the line? Well, it is almost continuously below 1 in 100 grade for 50 miles and there are curves so sharp that the wheel flanges scream for mercy. On one curve the leading buffers of the locomotive threaten the guard! Here, on the famous horseshoe, it is possible to sit on the train and watch the locomotive pulling in the opposite direction.

Let us have a look at the line in more detail. It starts off with a long climb at grades of 1-58 and 1-67, and then falls at roughly the same grade to Garelochard. This is just a practice bump. After Garelochard the first climb begins 5¾ miles of continuous ascent with the ruling gradient below 1 in 80. Respite follows with the drop to Arrochar and Tarbert, almost 4½ miles at an unbroken 1 in 56.

From Arrochar and Tarbert to Ardlui the line employs Battersea Fun Fair tactics, going up and down short sharp gradients like the switchback. One imagines the train is trying to gather as much momentum as possible for the next hard pull, the eight miles of hell between Ardlui and Crianlarich where the gradient is persistently below 1 in 70.

After a short mile of relief at the top there comes the next long, hard pull—seven miles with the commonest grade 1 in 60. The line then falls down to Bridge of Orchy before the fourth pull, three miles at 1 in 63 in a total of 7½ miles.

From the summit to Rannoch the line reverts to Battersea tactics, although now there are more down grades than up. But the next stretch, from Rannoch to Corraugh, brings miles of battling, including 1¾ miles at 1 in 53. Luckily, it contains a few short downgrades which allow rush methods to be attempted. From Corraugh, the line falls for most of the time, sometimes quite steeply. There are six miles at 1 in 67—a long, long drag on the return journey.

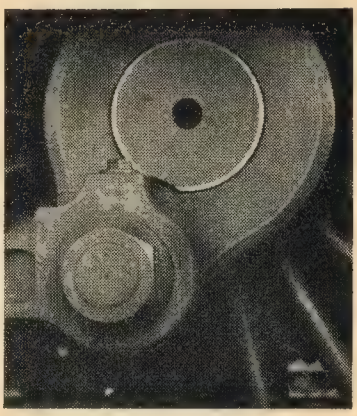
If you read this and then look at a Glen, you will find it impossible to imagine that the locomotives could haul trains of tremendous weight at fantastically high speed over this route. They were masters of the line. Ask any one of the North British what locomotive he would like for taking a train over the West Hielant and he is sure to plump for the Glen, although in later years these dour Scots have grown very fond of William Stanier's Black Fives which now serve on the journey.

In Scotland I had a word with a North British man who had driven the Glens. When I asked him what pleased him about the engines—he said that he liked their easy free running, their quick acceleration, their ability to hold speed and, above all, their magnificent steaming. He pointed out that the steaming depended on learning to fire properly; if the engines were fired wrongly they would not produce steam. The Scots were hard men; they believed in firing one-handed, and the left hand was the one they used. What is more, the door had to be shut between each shovelful; the Glens did not like the door left open—a feature of all North British engines except the Atlantics.

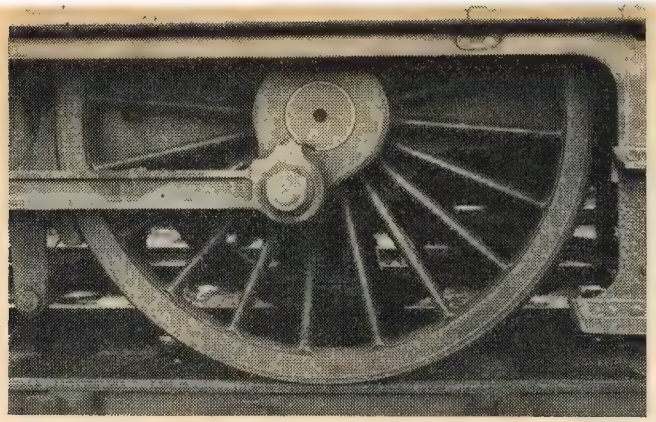
By and large the Glens were left to the West Highland. The Scotts were also used but they did not give quite the sparkling performance of the Glens on the banks. Their domain was more the Edinburgh-Glasgow line. At times the Glens were to be found on all parts of the North British system; they did some very fine work on the Aberdeen line.

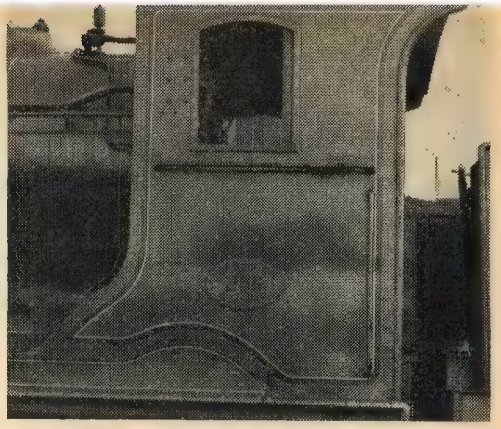
The first ten locomotives appeared

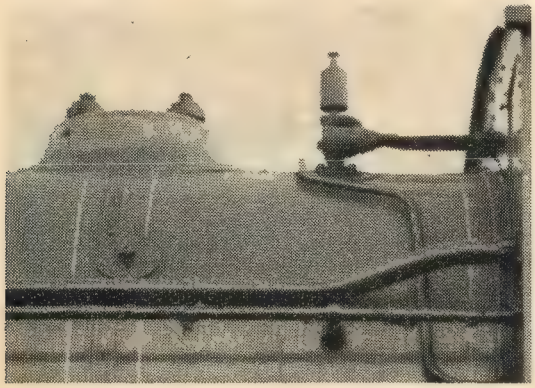
North British Railway works plate on GLEN DOUGLAS, *one of the original ten*



Coupling rod end. The crank is edged with black and painted chiefly in NBR brownish-green. There is yellow lining on the edge of the axle. Between the green and the black runs a line in red



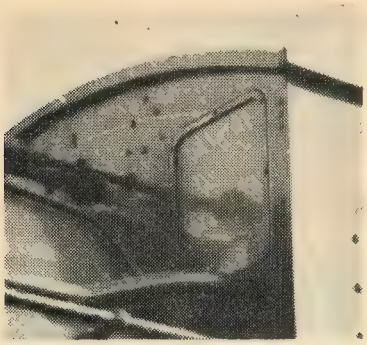




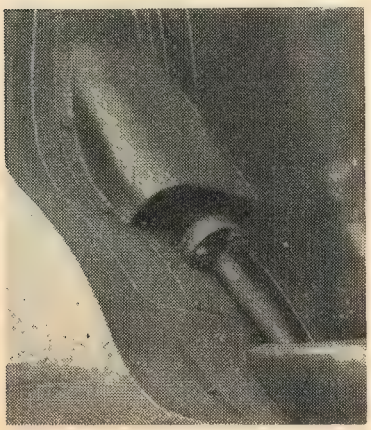
Above, left: Rear coupled wheel and the brake rigging

Above, right: The cab of GLEN DOUGLAS *gave good shelter on the wild West Highland route*

Left: Safety valves and cover are neat. Look at the whistle and at the painting of the boiler bands



Cab window cut away around firebox



GLEN DOUGLAS *with reversing screw on right-hand side. Later engines of the class have it on the left*
(*Pictures are by Brian Western*)

in 1913-14, the first five with Schmidt superheaters and the second five with Robinson. It was some years before the remainder entered service. In 1917 Glens *Dochart*, *Quoich*, *Shiel*, *Fruin* and *Ogle* were introduced. Glens *Mamie*, *Garry*, *Lyon*, *Murran* and *Glyle* arrived in 1919. Nos 270 *Glen Garry* and 278 *Glen Lyon* were employed on the Fifeshire Coast Express when they were new, and No 287 *Glen Gyle* on the Glasgow-N. Berwick portion of the Lothian Coast Express. In 1920 Glens *Arklet*, *Aladale*, *Dessary*, *Fintaig* and *Cona* were introduced. Later in the same year the last batch, Glens *Garvin*, *Gloy*, *Gau*, *Luss*, *Loy*, *Mallie* and *Moidart* were put into service.

In my last article I mentioned that the LNER straightened out the list of Glens, putting them in order of construction. Some readers have asked me for the LNER revised numbering as they have had difficulty in getting details of it. This is hardly surprising as the renumbering was carried out at a time when the railway magazines were rationed for paper.

Here is the list. The numbers in brackets are the old NBR numbers; if you want the early LNER numbers, add 9000 to the NBR, and if you want the revised LNER numbering deduct 60000 from the BR.

Nos 62467 *Glenfinnan* (149), 62468 *Glen Orchy* (221), 62469 *Glen Douglas* (256), 62470 *Glen Roy* (258), 62471 *Glen Falloch* (266), 62472 *Glen Nevis* (307), 62473 *Glen Srean* (405), 62474 *Glen Croe* (406), 62475 *Glen Beasdale* (407), 62476 *Glen Sloy* (408), 62477 *Glen Dochart* (100), 62478 *Glen Quoich* (291), 62479 *Glen Shiel* (298), 62480 *Glen Fruin* (153), 62481 *Glen Ogle* (241), 62482 *Glen Mamie* (242), 62483 *Glen Garry* (270), 62484 *Glen Lyor* (278), 62485 *Glen Murran* (281), 62486 *Glen Gyle* (287), 62487 *Glen Arklet* (503), 62488 *Glen Aladale* (504), 62489 *Glen Dessary* (490), 62490 *Glen Fintaig* (502), 62491 *Glen Cona* (505), 62492 *Glen Garvin* (34), 62493 *Glen Gloy* (35), 62494 *Glen Gour* (492), 62495 *Glen Luss* (493), 62496 *Glen Loy* (494), 62497 *Glen Mallie* (495) and 62498 *Glen Moidart* (496).

Dimensions of the Glens were: cylinders 20 in. × 26 in.; coupled wheels 6 ft dia.; bogie wheels 3 ft 6 in.; boiler 5 ft; length of barrel 11 ft 4 in.; heating surface 1,640 sq. ft (firebox 139.7 sq. ft., superheater 355.2 sq. ft., grate area 21.3 sq. ft). Boiler pressure was 165 p.s.i., although I have seen it recorded as 170. The tender, mounted on 4 ft wheels, could hold 4.525 gallons of water and seven tons of coal. Overall height of the engine was 11 ft 4 in., overall weight 103 tons 17 cwt, and tractive effort 20,260 lb.

The class was fitted with piston valves, Westinghouse brakes and Wakefield mechanical lubricators, but the Westinghouse brakes were later removed. While the original series of Glens had the reverser on the left-hand side of the cab, the later engines had it mounted on the right. At one time a number carried the Wakefield anti-carbonising equipment whose purpose was to ensure that only the right amount of oil reached the various parts without excess.

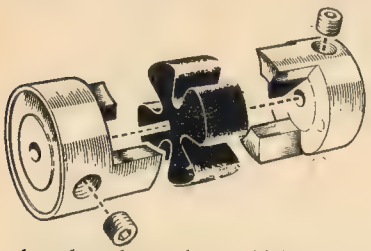
★ *To be continued*

AROUND THE TRADE

Shaft coupling

DIRECT coupling of small power-driven shafts, such as the propeller shafts of model boats, and miniature motors and generators, often involves difficulties in getting exact alignment and efficient transmission. Some of the couplings used are extremely crude, and introduce lost motion, excessive friction, or both; a serious matter in small installations.

A simple type of coupling, now offered in a range of sizes to suit shafts from $\frac{1}{8}$ in. to $\frac{3}{4}$ in. dia. (by 1/16ths), simplifies alignment, and ensures shockless and low-loss transmission. It consists of two die-cast



claw-shaped members which can be secured to the respective shafts by socket grubscrews, with a resilient rubber member between them. While this is not classed as a universal joint in the strict sense of the term, it will tolerate a small amount of axial misalignment and up to $1\frac{1}{2}$ deg. of angular displacement. The smallest size, for $\frac{1}{8}$ in. shafts (capable of opening out to $\frac{3}{16}$ in.), is $\frac{5}{8}$ in. dia. $\times$ $\frac{3}{4}$ in. overall assembled length; it will transmit 1/10 h.p. at 3,600 r.p.m.

This device, the Essex-Lovejoy Flexible Coupling, is marketed by the Motor Gear and Engineering Co., Essex Works, Chadwell Heath, Essex, which manufactures universal joints of the Hooke's type and several other specialities for power transmission.

Fast firelighting

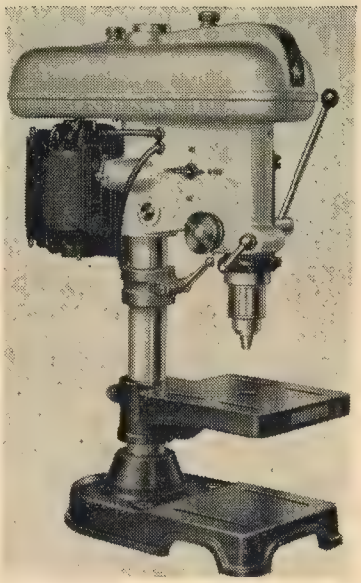
THE irksome task of lighting the fires is often a deterrent to the use of solid fuel, and a reason for preferring another. With gas the so-called gas poker simplifies firelighting. A similar device for paraffin, is now on the market.

The Quik-fire Para-poker consists of a burner tube with a fine jet and a control tap, gravity fed from a container which holds about half a pint of paraffin. An asbestos wick is provided at the end of the burner tube, and in lighting up there is sufficient fuel to moisten the wick, when it can be lit by a match. The burner is then inserted in the grate, with the coal or coke, preferably in small pieces, piled over and around it. In a few minutes the fire will be well alight; the fuel tap may then be shut, but the residue of fuel in the burner tube should be allowed to burn out before it is removed. If the jet should become choked, it may be cleared by opening and shutting the fuel tap two or three times; but as a fine filter is provided in the fuel reservoir, this eventuality seldom occurs. An adjustable stand, enabling the burner to be set at a slight downward slope, is provided at the outer end of the tube.

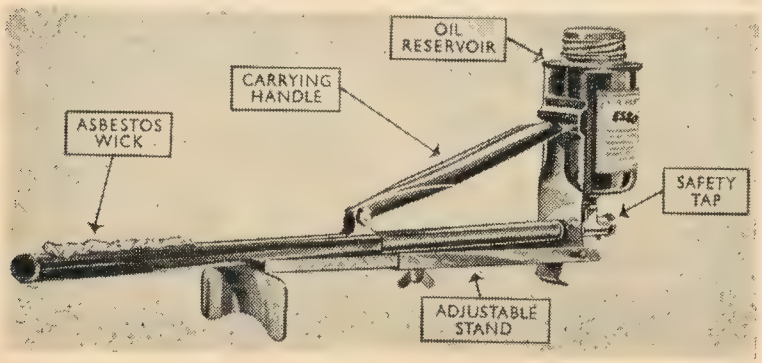
The Para-poker, which may be obtained from most ironmongers and hardware dealers is suitable not only for lighting industrial fires, but also for model coal-fired boilers of various types, small metal casting furnaces, and so forth. It is economical with fuel and safe in use. The manufacturers are the Harrison Group, 2-14, Wilson Street, Glasgow.

Versatile Fobco

THREE accessories make the Fobco precision drilling machine still more useful—as one of the lucky winners in the ME Be-a-Judge Competition will have the pleasure of discovering at first-hand.



The mortising attachment comprises an aluminium chisel holder, hollow chisel and bit, and a quick-action clamping device; the Morse taper spindle can be fitted as an alternative to the standard spindle; and the chuck guard is a transparent plastic shield, hinged to make the drills easily removable and spring-loaded to keep it in position while the machine is running.



Railway enamels

AFTER carrying out confirmatory tests, The Humber Oil Company Ltd, has issued a report of interest to ME readers who use railway enamels:

"For steam models we recommend an undercoating of Humbrol Chromate Primer before applying the finishing coat of Railway Enamel; this is particularly desirable on brass, as the adhesion of enamel directly applied to brass is not very durable. With or without the primer, our enamels will withstand a boiler temperature of 100 deg. C, though some of the colours may suffer a slight change of shade. On the smokebox, where only black is used, the temperature goes up to 200 deg. C and here again the enamel is quie safe and unharmed, though the little gloss in it will be lost. This is, of course, true of real engines as well; the smokeboxes are invariably matt black."

Continued from 13 April 1961, pages 448, 449, 450 and 451

COMPETITION for beginners

Newcomers to locomotive modelling are invited to enter Rob Roy at the 1962 ME Exhibition

AN ME STAFF FEATURE

A CORRESPONDENT has pointed out that in describing the making of the coupling rods for *Rob Roy* I mentioned that the axleboxes had to be packed up to running position before the rods were fitted, and that the axleboxes could be clamped by inserting small pieces of metal between the bottom of the axlebox and its hornstay, and tightening the nuts on the spring pins.

As the correspondent rightly says, in *Rob Roy* there are no spring pins ! I am afraid that the slip was caused by my being so familiar with the normal design of axlebox that the difference never occurred to me. But it should still be quite satisfactory to insert the pieces of metal (which should be $\frac{1}{8}$ in. thick) and jam in bits of hardwood between the top of the horn and the top of the axlebox.

In the last instalment we had finished the machining of the blocks and had completed the ports and passages. The next parts to tackle are the steamchests. For those who are clever with files, machining is hardly necessary though I would prefer to use the lathe or milling machine myself. If the setting up is carefully done, using the four-jaw is probably the quickest method in the lathe. Machine one of the bolting faces first. Then do the sides and the front end, and finally the second bolting face. Do not forget to use strips of brass between the chuck jaws and the job in all the set-ups except the first, or the machined surfaces will be spoilt.

As the final set-up covers the turning of the gland boss, make quite sure that the steamchest is held true. Note, too, that the boss has to be offset (see drawing on page 450, April 13).

Without moving the steamchest in the chuck, put a centre drill in the tailstock, centre deeply, drill No. 25 and ream 5/32 in. dia., remembering to use top speed for the drilling and lowest speed for the reaming. Open out for the gland by using a pin-drill $\frac{1}{4}$ in. dia. with 5/32 in. guide pin (if your only pin drill has $\frac{1}{8}$ in. pin, the through hole should be reamed $\frac{1}{8}$ in. dia. to begin).

Put in a letter J drill to a depth of $\frac{7}{16}$ in. and tap $\frac{5}{16}$ in. × 32 t., using a pilot tap if you have one. Pilot taps can be obtained in this thread size with $\frac{1}{8}$ in. and 5/32 in. guide pins, and are very useful for glands.

Steamchest cover

The steamchest cover is simply a flat rectangular piece of $\frac{1}{8}$ in. brass, $2\frac{1}{8}$ in. × $1\frac{1}{4}$ in. After marking out the holes in it, drill them No. 43 to begin, and then use it as a jig to drill both the steamchest and the cylinder block. Place the holes carefully to avoid the gland and the steam passages, and do not go in too deep into the block; $\frac{1}{4}$ in. should be sufficient.

To ensure tapping these holes in the cylinder block square to the port face, it is a good idea to start the tap in the drilling machine, pulling the belt by hand. After the 12 holes have been tapped 6 BA, open out the holes in the covers and steamchests with No 34 drill. Studs about $1\frac{1}{16}$ in. long would look best to hold down the covers.

We now come to the pistons and piston rods. Drawn phosphor-bronze rod is about the best material for the pistons. Light alloy can be used but I do not like it myself as the composition varies so much. Some alloys make excellent pistons, and some do not. Anyway, more allowance has to be made for expansion or the pistons may seize.

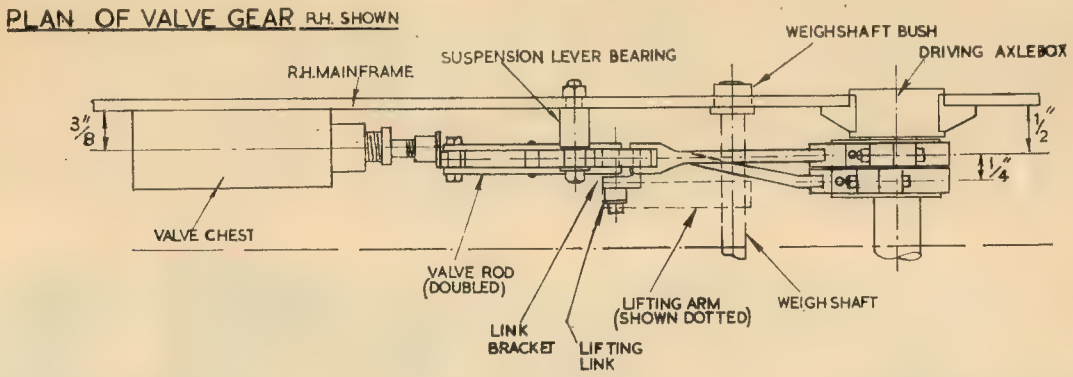
Make the piston rods first. They are simply $3\frac{1}{4}$ in. lengths of $\frac{3}{16}$ in. dia. rustless steel, with $\frac{1}{4}$ in. of $\frac{3}{16}$ in. × 40 t. thread at one end. The other end is chamfered and very slightly tapered with a smooth file to make entry into the crosshead boss easier.

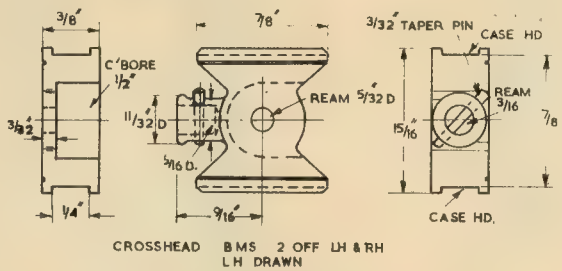
Rough turn the two pistons from 1 in. dia. material, leaving them about 1/64 in. oversize. Centre deeply and drill right through 5/32 in. dia. Tap $\frac{3}{16}$ in. × 40 t., and open out to a depth of $\frac{5}{16}$ in. with No 13 drill. Hold the piston rod very tightly in the tailstock chuck and screw into the piston blank by pulling the lathe belt by hand, at the same time feeding in the tailstock.

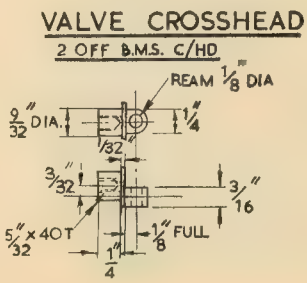
To finish off the pistons, chuck them in a $\frac{3}{16}$ in. collet or make up a split bush. It *is* possible to use the three-jaw. But experiment first with a length of the rod used for the piston rods, packing one or two jaws with brown paper until the rod is running dead true. Turn the packing groove with a sharp parting tool, making the groove $\frac{1}{8}$ in. wide and about $\frac{1}{8}$ in. deep. Finish turn the pistons, using a pointed tool with the tip rounded off at a radius of about 1/64 in. At medium speed this should give a good finish.

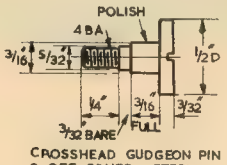
The pistons should enter the bores and slide freely but without any shake; the packing is a ring of $\frac{1}{8}$ in. graphited yarn with the ends scarfed. It should not be necessary to force the piston into the bore once the packing is in position. Even when

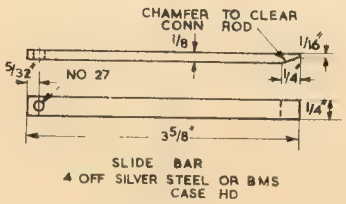
MARTIN EVANS writes the fourth instalment—which deals with cylinders, crossheads and slide bars—of his serial on the 3½ in. gauge model of the McIntosh shunter

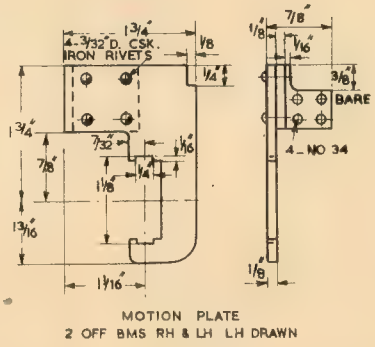












packed, the piston should not be too stiff to move in the bore.

You can make the slide valves from gunmetal castings or from drawn gunmetal bar $\frac{7}{8}$ in. × $\frac{1}{2}$ in. (commercial size); I prefer the bar. It is wise to cut the cavity first and then machine the outside, measuring from the edges of the cavity, which should be at least $\frac{1}{8}$ in. deep. A 3/32 in. dia. slot-drill is a suitable tool. The valve blank is held in a machine vice bolted to the vertical slide; the slot-drill is held in the chuck or collet.

Make certain that the vertical slide is quite square to the mandrel of the lathe. Use a true packing strip in the vice jaws behind the chuck blank of such a width that the blank is brought out beyond the chuck jaws by the necessary amount. The blank should, of course, be cut long enough for the two valves.

By careful manipulation of the cross-slide and vertical slide handles, and feeding in the blank by the lead-screw handwheel, a perfect cavity should be produced. The outside surfaces of the valves can be end-milled in exactly the same way. They can even be filed.

Finally, two slots are required across the top, one of them $\frac{3}{16}$ in. wide longitudinally and the other $\frac{1}{4}$ in. wide for the driving nut. This second slot should not be cut with a $\frac{1}{4}$ in. end mill but with something a little smaller; otherwise, if commercial $\frac{1}{4}$ in. square brass bar is used for the driving nut, there may be slop between the two when a close fit is important.

Note that the tapped hole in the driving nut is off-set slightly. In fitting the valve, make sure that, with the nut and spindle in position, it is possible for the valve to be raised a few thou from the port face. The valve spindles are simple enough—$2\frac{9}{16}$ in. lengths of 5/32 in. dia. rustless steel, threaded 40 t. at each end.

The cylinder covers can now be drilled for attachment to the blocks. Eight 6 BA screws with hexagon heads are used. Space out the holes in the covers carefully so as to avoid the steam passages and give plenty of clearance for the slide bars.

Piston and valve rod glands can be machined and fitted next; the piston glands are threaded $\frac{3}{8}$ in. × 32 t. and reamed $\frac{3}{16}$ in. dia.; the valve rod glands are threaded $\frac{5}{16}$ in. × 32 t. and reamed 5/32 in. dia. They should be made $\frac{7}{16}$ in. long overall. The threads are cut a shade on the large size so that they will not slacken off in service, and the heads should have $\frac{1}{16}$ in. dia. radial holes drilled in them so that they can be adjusted in position, four in the piston rod glands and six in the valve rod glands which are not quite so accessible. Alternatively, hexagon bar could be used, $\frac{7}{16}$ in. A/F for piston glands and $\frac{3}{8}$ in. A/F for valve.

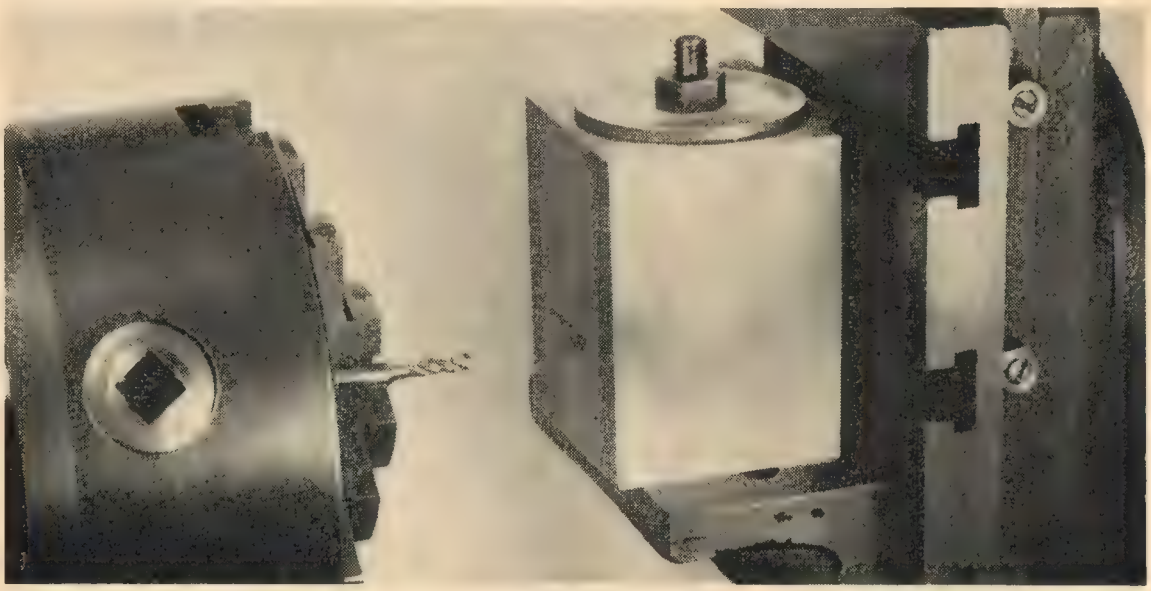
Temporarily assemble the cylinders, packing the glands with $\frac{1}{16}$ in. graphited yarn, and make the steamchest joints with 1/64 in. Hallite sheet. The cylinders are bolted to the frames by six 5 BA screws, four placed on the lower flange and one on each side of the exhaust way on the upper flange. They engage in tapped holes in the main frames and are quite strong enough as the thrust of the pistons is taken up directly against the frames with this design of cylinder.

An unfortunate error has crept into the full-size drawings. On Sheet 3 the centre-line of the valve spindle is shown as coming $\frac{1}{2}$ in. from the inside of the frames. The $\frac{1}{2}$ in. should have been $\frac{3}{8}$ in., necessitating an offset in the valve crosshead.

As the thicknesses of the Hallite sheet take up 1/32 in., this valve crosshead offset need not be more than 3/32 in. A correct drawing showing the points accompanies this instalment. Any builder of the engine who has already bought the set of *Rob Roy* drawings and is still in doubt can send the appropriate drawing to me, care of the Editor, and I will make the necessary alteration.

The slide bars are very simple—nothing more than $3\frac{5}{8}$ in. lengths of $\frac{1}{4}$ in. × $\frac{1}{8}$ in. silver steel, or mild steel case-hardened. In fact, it is not essential to harden them at all; kept well lubricated, they will last quite a long time, and can be quickly replaced. The outer ends are chamfered as shown. A single 4 BA Allen screw, $\frac{5}{16}$ in. long under the head, holds each bar on to the back cylinder cover, but do not fit the bars just yet.

The main crossheads are cut from mild steel bar 1 in. × $\frac{3}{8}$ in. First reduce a suitable length to exactly



Milling ports of slide-valve cylinder in the lathe

31/32 in. wide, and then put in the slide bar grooves. For anyone with a milling machine, this is child's play. With a lathe, you can use a small diameter slotting, a side-and-face cutter, or a $\frac{1}{4}$ in. end mill in the chuck, holding the crosshead blank in the machine vice on the vertical slide. Be very careful to remove only 1/32 in. from each edge. The distance between slide bars should be $\frac{7}{8}$ in.; this can be checked with the micrometer if strips of a thickness already measured are put into the slots.

Next, drill and ream right through 5/32 in. dia. for the small end or gudgeon pin, and open it out on the back with a $\frac{1}{2}$ in. dia. pin-drill; or counterbore to a depth of 9/32 in., using low speed and plenty of cutting oil.

File the exterior shape of the crosshead, leaving the crosshead boss about 11/32 in. square for the moment, then the small end recess is cleaned out to allow space for the movement of the connecting rod. Mount the crosshead in the four-jaw, boss outward, and set it to run true by the grooves and the outside of the crosshead, *not* by the filed boss.

Then the boss is turned, drilled No 14, and reamed $\frac{3}{16}$ in. dia. Do not put the reamer quite through. Use the piston rod itself as a gauge; the rod should not be able to enter more than $\frac{1}{4}$ in. by hand pressure. The turning of the outside of the boss may appear impossible at first sight, but if a small boring tool of the solid pattern is specially ground up the job is not nearly as difficult as it looks. I keep a tool specially made up for it.

The gudgeon pin itself is turned from $\frac{1}{2}$ in. dia. silver steel with its journal well polished. It does not need to be hardened. A 4 BA nut and washer on the outside complete this component.

Cut out the motion plates from $\frac{1}{8}$ in. bright mild steel plate. Take great care in marking out and filing to shape, especially with the little recesses which carry the outer ends of the slide bars. A piece of steel angle $\frac{7}{8}$ in. long × 1 in. × $\frac{7}{8}$ in. is riveted on as shown. The side which lies against the main-frames is cut away on the upper side and four holes are drilled for attachment to the frames.

In my next *Rob Roy* article, I will deal with the assembly of slide bars, crossheads and motion plates.

★ *To be continued on June* 8

CANBERRA . . .

Continued from page 573

the inner angle of the uprights (Fig. 57).

With the moulding on the base securely fixed, the glass can be pushed into the space left for it, this having first been flooded with adhesive to a depth of about $\frac{1}{16}$ in., and the lower edges smeared with adhesive inside and out—not too much on the inside as any excess is difficult to remove at this stage. See that the upright angles between the sheets of glass are lined up true. Bind a cord around the four sides to hold the glass in contact, and lay a flat board on top with weights to keep it down while the adhesive sets.

When the sides are set, you can fit the top, using *passe partout* to hold it down and to keep it in position sideways. Putting adhesive on the meeting surfaces of the glass is liable to give trouble with blobs running down on the inside. In applying the *passe partout*, care should be taken to mitre the corners neatly. If one uses two thicknesses the inner one can be overlapped and only the outer one mitred. I have made no reference to staining or polishing the case as this can be left to the taste of the modeller A nameplate, giving at least the name of the ship, should be pinned along the moulding. You could make it from a strip of thin, plastic material, and engrave the name on it; if the letters are filled in with black ink or paint it will stand up to being dusted. It is usual, and advisable, for the modeller to sign his name on the underside of the case, with the date, and to add the name of the ship, the scale of the model, and any other particulars.

From letters received from builders of *Canberra* it is obvious that there are some points which are not quite clear. I was under the impression that the hawsehole in the stem was for an additional anchor, but apparently it is provided for a hawser when the ship is moved to a buoy. The hawse-pipe comes through to the fo'c'sle head just aft of the bollards, on the centreline at the stemhead, and the hawser is belayed to the bollards further aft. The deck of the fo'c'sle head is planked throughout. The name of the ship is, in each place, painted in fairly dark blue—perhaps royal blue.

I shall be pleased to hear from any builder of the model who may desire help. A letter to the Editor will reach me.

SIRENA . . .

Continued from page 580

putting through the same size drill as is used to make the valve bodies, the pipe can be marked for drilling for the two nipples which have to be brazed in. Before they can be silver soldered into position the two 4 BA union nuts will be needed.

As the $\frac{3}{16}$ in. pipe will be quite soft from the silver soldering and annealing, care will be needed in drilling the 9/64 in. holes to take the nipples. To allow as much elbow room as possible for the silver soldering, a short stub of 7/32 in. × 40 should be screwed into each of the union nuts. It will keep them as far as possible out of harm's way. It would obviously be disastrous to get any silver solder on to the nipples and union nuts. Coned nipples should not be used or, on assembly, the pipe will have to be strained and the work will be made more difficult.

Of the safety valve stand in Fig. 43 I need say little. Once again the height of the $\frac{1}{4}$ in. × 40 nipple can be decided only with the stand screwed into position in the boiler crown, on the line shown in the boiler drilling chart (Fig. 13). The dimensions of the nipple should not be exceeded.

Screw the main steam stand (Fig. 44) into the boiler crown before you decide on which hexagon face to locate the 9/32 in. × 40 nipple. As soon as this has been made and brazed into position, the stand should be screwed into the crown when the length of pipe needed to connect up to the regulator can be measured. While the position for the stand is not critical, the stand should be kept away as far as possible from the regulator and $\frac{1}{2}$ in. away from the smokebox. The longer the connecting pipe the easier it will be to connect up, particularly if the faces of the two nipples are not perfectly square to each other.

Cut off a length of $\frac{3}{16}$ in. o.d. pipe and face both ends in the lathe so that it is exactly the required length. Make two copper nipples and also the two 2 BA union nuts. Place the union nuts on the pipe and fasten the nipples to it with the least possible silver solder. If there is any doubt about the final brazing, the pipe can be made slightly overlength and faced up in the lathe with union nuts and nipples in position. One union nut is locked on the pipe with the aid of a short stub of 9/32 in. × 40. Both union nuts and the pipe are placed in the chuck. While the rear nut locks with the stub and the front nut acts as a steady, the pipe can be faced off with light cuts, both ends, of course, receiving the same treatment until the pipe fits snugly between the stand and regulator.

★ *To be continued on May* 25

READERS' QUERIES

DO NOT FORGET THE QUERY COUPON ON THE LAST PAGE OF THIS ISSUE

This free advice service is open to all readers. Queries must be within the scope of this journal and restricted to one problem. The replies published are extracts from fuller replies sent through the post: queries must not be sent with any other communications: valuations of models, or advice on selling cannot be given: stamped addressed envelope with each query. Mark envelope clearly "Query," Model Engineer, 19-20 Noel Street, London W1.

Gilded brass

Considering how much I have read about metals, I am surprised that I should have to write to you on the gilded finish of brass articles.

The finish is seen on various articles: on microscope brass parts, on the metal parts of hand-bags and on the locks and parts of superior travel-goods. I have also seen it on articles in the multiple stores and elsewhere a good deal lately; and the prices prove that it is not obtained by gold plating.

I thought the finish was obtained by electrical deposition of brass, but a few weeks ago I read in a book on plating that certain surface effects were obtained on brass by dipping it in a fluid mixture whose chief ingredient was acetate of lead. —J.E., Finsbury Park, London.

▲ *The articles you mention, such as microscopes, handbags and locks of travelling cases, are usually finished by lacquering, using either plain or tinted lacquers to obtain the effect.*

Sometimes electrolytic finishes are employed, and there are also chemical compositions for blackening or colouring the surface before lacquering. A full range of lacquers and chemical colourings could be obtained from W. Canning Co. Ltd, St John's Street, Clerkenwell, London, EC1.

Regulator leak

I am halfway through building the *Tich* locomotive. In giving the boiler its steam test, I found that the disc in the tube regulator leaked so badly that it was impossible to maintain boiler pressure. I then made another port block and lapped the valve into it using Vim, but again I found that this failed to give a good seal.

In three different articles on how to make disc-in-tube regulators, I have not come across any advice which would enable me to overcome this difficulty of leaking. Have you any suggestions to offer which would cure the trouble, or would you advise me to make a different regulator? I have toyed with the idea of adapting the slide valve regulator as used on *Petrolea* to fit *Tich*, as I think that the trouble with the disc in the tube regulator is that there is not sufficient overlap of the valve over the ports in the off position. The slide valve type seems to get over this difficulty.—W.H., Thornton Heath, Surrey.

▲ *There seems to be no reason why a disc-in-a-tube regulator should not be satisfactory. Possibly the overlap in the shut position is, as you suspect, insufficient.*

Another possibility is that the valve is not truly mounted on its guide pin, or that the valve is too slack on its guide pin and the spring is pushing the valve a bit to one side.

The slide valve regulator is generally very satisfactory.

Plastic strip

Can you tell me the name of a firm from which I can get plastic strip, flat, black, $\frac{3}{8}$ in. and $\frac{1}{2}$ in. wide? It must be rigid when cold and supple when warm. Can you recommend a book on the design of boat hulls?—R.B.M., Bicester, Oxon.

▲ *The material most likely to suit your purpose is PVC which can be obtained in various grades of flexibility and normally becomes more flexible when worn. It is manufactured by Erinoid Ltd, Lightpill Mills, Stroud, Gloucestershire.*

We regret that we do not know of a book on the design of boat hulls of the type referred to, but we suggest that you may be able to obtain further information on this matter from the Editor of Yachting Monthly, *3-4 Clement's Inn, London, WC2.*

No tailstock

I have just obtained an old Myford $3\frac{1}{2}$ in. ML2 lathe without the tailstock and I would be pleased if you would help me on the design of a new tailstock (casting preferred) and testing the bed and saddle for wear.—R.C., Killingworth, Newcastle-upon-Tyne.

▲ *It is probable that the Myford Engineering Co., Neville Works, Beeston, Notts, would be able to supply a finished tailstock no dearer than a casting.*

Testing the bed and saddle for wear calls for the use of equipment which is not normally found in a small workshop The flatness would have to be tested by comparison with a large surface plate, together with special test slips to check the dove-tailed surface, a dial test indicator, and standard test bars. Any serious wear might have to be corrected by remachining or grinding the surface, followed by hand scraping, with further tests.

Which boiler?

I want to make a small boiler to steam a horizontal home-made engine $\frac{1}{2}$ in. bore × $\frac{3}{4}$ in. stroke. Having no means to braze, I propose to use rivets and soft solder.

The boiler would be 3 in. dia. × 6 in. long. It can be horizontal with three $\frac{1}{4}$ in. dia. water tubes, or vertical with eight $\frac{3}{8}$ in. dia. fire tubes. The firing would be gas, or methylated spirit. Which will be the easier to make?

I have been a reader of MODEL ENGINEER since 1912.—C.B., West Kensington, London.

▲ *Your method of constructing the boiler should be quite satisfactory, provided that all joints are closely fitted and that parts are thoroughly tinned before assembly.*

The vertical boiler would probably be the easier of the two to construct. It is the easiest to fire as well. Particular care should be taken in the fitting of the fire tubes, especially at the lower ends. If they are made a neat push fit before soldering, they should give no trouble.

New reader not too late

Could you tell me if a set of working drawings is obtainable for the $3\frac{1}{2}$ in. and 5 in. gauge ER class B1 4-6-0 locomotive which Martin Evans recently described in ME? What is the minimum radius curve the model will take at the two gauges?

As I am a new reader of ME I missed the series.

May I congratulate you on an excellent and informative magazine? —R.A.R., Easington College, Co. Durham.

▲ *Working drawings are obtainable for the* 4-6-0 *locomotive* SPRINGBOK *in 5 in. gauge only. The price for the complete set is 54s. post free. Individual drawings are priced as follows: No* 1 *4s. 6d., Nos* 2 *to* 11 *5s. 6d. each.*

The serial describing the construction of SPRINGBOK *ran each fortnight from* 10 *December,* 1959 *to* 8 *December,* 1960. *Back numbers of these may be*

had from PM Back Numbers Department at 1s. each, plus postage.

The minimum radius that SPRINGBOK *will take at low speed is about 18 ft. About 30 ft is recommended for fast running.*

Gas refrigerators

Could you please tell me the basic workings of a domestic gas refrigerator and if it would be possible to make one in the home workshop.C.E.H., Crich, Derbyshire.

▲ *Domestic gas refrigerators operate on what is known as the absorption principle; they depend on the balance of pressure in different gases.*

Such a refrigerator although apparently simple, would be extremely difficult to make properly in a home workshop, particularly when it came to charging the system with gas.

Perspex discs

I have some flat discs of Perspex, 9 in. dia. with a 1½ in. dia. centre hole, $\frac{3}{16}$ in. thick as used for drip trays on altar candlesticks.

It is required to press these into the form of a shallow saucer without destroying the polished finish. Can you tell me how this can be done? I have the usual equipment of a dental laboratory.—R.E.H., North Shields.

▲ *Perspex and other thermo-plastic materials of this type can be softened by heating them to about the temperature of boiling water, after which it is possible to form them with hard wood or metal dies.*

Some practical information on heat forming plastics was published in ME of 16 August 1956, now out of print.

Reversing gear

I would like to know if it is possible to fit a reversing lever of standard type to replace the existing wheel reverser on the 3½ in. gauge *Petrolea*. —E.P., Letchworth, Hertfordshire.

▲ *There seems to be no reason why you should not fit a lever type reversing gear to your* PETROLEA.

Details of a suitable gear were described in MODEL ENGINEER *of 12 February 1959, pages 209-211. You will have to make allowance for the different longitudinal movement required for your locomotive, while the shape of the reach rod may also need attention.*

Zoe in Southern Rhodesia

The steam locomotive *Zoe* by LBSC shows the two centre wheels of the coupled wheels without flanges. Is this true to the original and where did the original run? I am building *Zoe* in 3½ in. gauge with all wheels flanged. What radius would she be able to get around?—P.H., Southern Rhodesia.

▲ *The locomotive* ZOE *is a free-lance design representing a typical narrow-gauge engine. There would seem to be no objection to leaving the flanges on all the driving and coupled wheels. The engine in 3½ in. gauge should be able to negotiate a 20 ft. radius, but 30 ft. radius is recommended where space permits.*

Faulty starting

I have an electric motor with no h.p. on the plate. It is all right for a 3 in. grindstone, but it sometimes starts up in the opposite direction. The particulars on the plate are: Induction 230 v., 50-1 ph., 2,900 r.p.m. —R.B., Wallesey, Cheshire.

▲ *Presumably you have an ordinary split-phase induction motor with starting windings controlled by a centrifugal switch. If so, the fault may be owing to a break or a bad connection in the starting winding, or to burnt contacts in the internal switch. This type will often fail to start unless spun by hand, but in some cases it may be liable to start in either direction.*

If you can verify whether the fault is due to this cause, you will probably find it easy to put right, but if not, we will submit the problem to our electrical consultant who may be able to assist you on payment of a small fee.

Doris in Australia

I am constructing a 3½ in. LBSC 4-6-0 *Doris*, and I wish to change the type of piston valve to a Greenly double-ported with cast-iron liners, bobbins and rings. Would you please give me the necessary dimensions?

In quartering the wheels I have made an error whereby the left side leads the right. Does this matter if the valves are set to suit each side?

I have constructed an LBSC twin oscillating lubricator to ensure that each cylinder will obtain correct lubrication.—W.A.B., Victoria, Australia.

▲ *Greenly and Steel, 6 Summerleys Road, Princes Risborough, Bucks, can probably supply drawings of the double-ported cylinders.*

If the steam ports are made the same width as in the DORIS *design, it may not be necessary to alter the valve gear at all.*

It will not affect the performance of the engine if it is arranged with the left hand crank leading.

Model Engineer EXHIBITION

The next Model Engineer Exhibition will be held at the Central Hall, Westminster, opposite Westminster Abbey, from 16-26 August 1961, excluding Sunday.

Anyone wishing to enter a model, or other piece of craftsmanship, should write to the Exhibition Manager, Percival Marshall Ltd, 19-20 Noel Street, London W1, for an entry form.

Steam car

I am about to make a full-scale working model Peugeot-Serpellot steam car of about 1895, and would appreciate any help that you can give me.

I am making the exterior to the exact specifications as the original, but I want to incorporate a modern form of boiler and engine. For better results I am also using three gears, a modern clutch and a differential. Where I would very much appreciate your help is in the manufacture of the boiler. I have reports that Serpollet was experimenting with a flash boiler, but that it was not in the car that I intend to build. On reflection, I think that the flash boiler system would be far better for me, giving me higher p.s.i., and also a quicker method of starting the car from cold. My space is limited to about 3 ft × 3 ft × 1 ft, and the conventional boiler would take up more room.—A.G.L., Bromley, Kent.

▲ *Three gears and a clutch should not be necessary in a steam car, but a differentia l in any car would improve cornering.*

Most of the Serpollet cars were fitted with flash boilers, but the design must be regarded as experimental, as very little information is obtainable. Drawings of flash boilers suitable for steam cars, though not necessarily of the Serpollet type, can be obtained from Mr J. Walton, Craig View, Cannan Avenue, Kirk Michael, Isle of Man, who specialises in drawings, literature and equipment for steam car construction.

Flash boilers are continuously fed with water by feed pump driven either from the main engine or from an auxiliary steam cylinder, though modern cars have employed electrically driven feed pumps.

You could get a great deal of information on experimental work with steam cars from the British Light Steam Power Society; the secretary is Mr Robert G. Davis, Lindum, 309 Arundel Street, Portsmouth, Hampshire.

POSTBAG

The Editor welcomes letters for these columns. A PM Book Voucher for 10s. 6d. will be paid for each picture printed. Letters may be condensed or edited

FROM THE PAST

SIR,—Should ME reprint the Greenly articles of 1909 [Postbag, April 13] ? I would say that, without a doubt, the answer is "yes." I would also submit that in deference to those who have the 1909 copies, and to avoid a rather bald reprint, some extra material should be added wherever possible to bridge the intervening half-century. There are many readers who have all the issues.

Judging from my experience, the traction engine is now equalling, if not surpassing, the railway locomotive in general interest in our circles. Bearing in mind that the steam locomotive will become increasingly difficult to find, and that few people can preserve them on a length of track, I have no doubt that in the future the traction engine will gradually push the locomotive from its pinnacle.

In the past we have had drawn-out arguments on such small things as whether the radius on a particular chimney was a quarter-of-an-inch or nut. At the same time no one raised an eyebrow about a particular make of traction. It could have had a square-rimmed flywheel for all the notice it was given.

Please let us try to raise the status of the other poor old chuffers now fast passing into obscurity.

Swanley, Kent. M. LAWSON FINCH.

SIR,—I, too, have noticed the increasing interest in larger-size traction engine models and I take my hat off to the people who seem to build successful engines without the step-by-step instructions that I should require.

With reference to Henry Greenly's articles in ME of 1909, I feel that a word-for-word reprint of these articles, although better than nothing, would not meet with general approval from readers. They would need to be thoroughly revised by some authority, such as W. J. Hughes.

Much design and experimental work has been done on model traction engines since that date, and I for one look to ME as a re-distributing centre for the knowledge so gained.

I consider a 2 in. scale engine a good size for the average man to build and would ask ME seriously to consider a serial on a single cylinder engine of this size.

Wimbledon, Surrey. JOHN H. GARRETT.

LOOKING ALIVE

SIR,—Gas turbine locomotive GT3 could not help looking alive: it was designed by good steam locomotive men and built in a works with a long steam background—the Vulcan Foundry. Its bogie looks to me like one from a steam locomotive's tender—no need to go back to Dean !

Hastings, Sussex. E. A. LANGRIDGE

FAR FROM ILLINOIS

SIR,—The armchair was comfortable and the tram article interesting, and memory slipped back some 70 years or more. I remembered the horse cars on the Old Kent Road, and the men whose job it was to clean out the slot in the rail.

They cleaned it with a tool on the end of a long pole. The tool was a box about 8 in. × 12 in., and 5 or 6 in. deep, open at the top and front and narrow at the front end where a finger fitted down into the slot and threw the dirt back into the box as it was pushed along. I wondered if, among all the collections of trams, someone had found a tool like this. It would help to complete the story.

Lombard, Illinois. HERBERT J. ASHER.

FRENCH CLAIM

SIR,—After reading the letter from Bob Graham of Jersey City [Postbag, April 13], I would like to remind your readers that the MPBA recognise as an official world speed record the claim made by J. Menant of France of a speed of 81 m.p.h.

Secretary, MPBA. J. KING.

NEWCOMEN ENGINE

SIR,—I have read with interest the article on Watt and the Newcomen Engine [ME, April 6]. As far as possible, I have tried to make a model which represents the Science Museum print of the Newcomen Atmospheric Engine invented by Savery and Newcomen and erected near Dudley Castle in 1712.

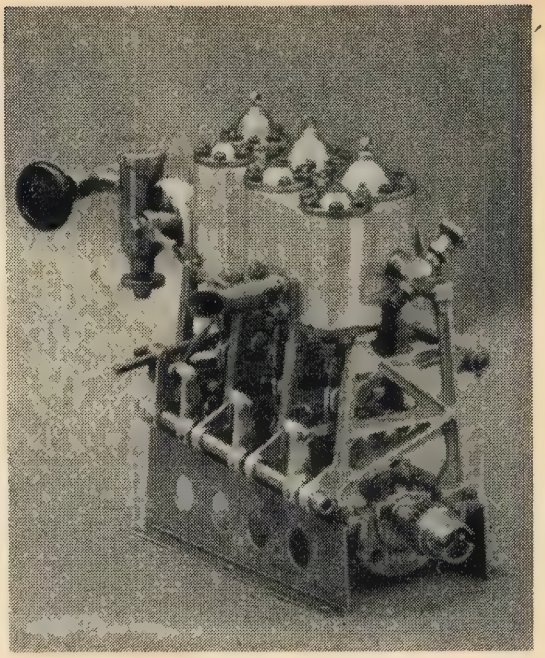
The cylinder is 1⅛ in. dia. and 3 in. stroke. I first tried to get it working with steam, as on the original. But I found that although it would work, it was so messy with the water that it would not do for any exhibition.

I now work it from the suction side of an air compressor in which, of course, the atmosphere does the actual work by pressure on the top of the picture. Certain parts have to be oversize, such as the weight in the valve gear to make the valves work.

These old engines are interesting as they embody problems which do not occur today.

Southbourne, Hampshire. H. J. TREVETT.

H. J. Trevett was naturally interested in the ME article on Watt and Newcomen, for he had made a model of the Newcomen engine erected near Dudley Castle in 1712. *See 'Newcomen Engine'*



Like Mr Trevett in Hampshire, Jean Rietsch in Paris was able to read in ME of a subject which directly interested him. He has modelled a Normand engine of the era described in "Kipling's Navy Needed Speed"

PARIS NORMAND

SIR,—I have read with great interest the two articles entitled "Kipling's Navy Needed Speed" [February 2 and 16].

I have constructed a model of the Normand engine from the same period. It operates perfectly.

Square du Vivarais, JEAN RIETSCH.
Paris.

FULLER DETAILS

SIR,—I would like to comment on the letter from Mr A. W. Davis of Southall [Postbag, April 13] and the editorial note.

As is known by some people, I am engaged in the construction of two 3½ in. models of the *City of Truro*, putting in all the details that I can get hold of and at the same time making a first-class working locomotive (I hope). A design for the 3½ in. *Truro* has been obtainable for some time now, but I do not really advise the scaling up of the dimensions exactly, as this would lead to great difficulties. I find that the locomotive is not so difficult as may perhaps be thought; even the reproduction of the Dean swinging link bogie comes out all right.

I have found that a major difficulty in building a good scale reproduction of a locomotive is the obtaining of accurate data in a usable form. Excellent photographs are easily had, but the task of getting actual dimensions from the average photograph is impossible owing to perspective, and so forth. Some of the photographs from the article on the full-size *Truro* have proved to be worth their weight in steam oil, especially the ones of the side view (flat on) of the bogie. The butterfly strengthening plates that are riveted on each side are very difficult to get just right, and were not shown on the offical drawings of the bogie that I got from Swindon. Even with the aid of the photographs (and a calculating machine for the scaling) it took me three attempts to get them satisfactory.

There are discrepancies between the official drawings, the actual engine, and the first-class drawing of J.N.M. in Locomotives I Have Known. This, of course, does not make things easier, but I have taken the photographs of the actual engine as the final authority.

Although the locomotives mentioned in the editorial note are indeed good engines, no one can suggest that they are fully detailed in rivets and so on. In two instances, LBSC seems to have preferred nuts on the outside of his crankpins; I built two locomotives before I realised that this was not correct practice. The GWR engines, for instance, have a specially made C-nut which then has a taper pin put through from the axle centre to the outside. This is very easy to make and fit, and is worth the slight trouble involved, but where is the average person to get the correct proportions for such details?

Again, when I drew out the tracings of *Pansy*, I had to put in much extra detail to make what I consider a worthwhile job. I need hardly add that nothing whatsoever was altered; details were added, but by no means all of them.

Southall, K. E. WILSON.
Middlesex.

SOVIET NOT FIRST!

SIR—MODEL ENGINEER of March 16 (page 331) has a drawing of a machine vice for holding round components. It is said to have been developed in the Soviet Union.

I work at Dean Smith and Grace Ltd, lathe manufacturers, and the vice described is almost an exact copy of one which we use. It has been in use at Dean's for over 25 years. I think it was made by E. H. Jones of London.

Keighley, R. WATSON.
Yorkshire.

BACK IN MALMO

SIR,—I thank ME very much for its very pleasant treatment of me, on my visit, and for the kindly notice in Smoke Rings.

I have already had three offers of *Juliets*. With this great support by

ME, I will have a solution of my problem.

My trip was very tiring, but it was fun to see England again and be favoured to meet new and old friends. I hope that the English people will be treated in the same gentle way when they come to see us.

I want to send my best wishes to you all at ME.

Malmo, Sweden. ALLAN ANDERSSON.

MOORCOCK . . .

Continued from page 586

tugs on the Thames; she is capable of handling any ship, and to fulfill this requirement she is fitted with two hooks. When you shape the small pieces, make enough for two.

All that remains to be added before the painting are the different types of ventilators and the handrails. There are two very prominent cowl ventilators on the after end of the boat deck to supply the needs of the engine room. This type is also found, much smaller in size, further along the boat deck close to the ladders up from the main deck. Near the funnel on either side is a mushroom ventilator, and on the flying bridge above the battery and drying rooms and the engineers' store are ventilators of the gooseneck design.

Handrails are always a problem on models. Where there are long runs, a small jig is always helpful in getting a uniform spacing. But on a tug like *Moorcock* the hand rails are tailor-made. They can, perhaps, best be modelled by fitting each stanchion to the deck first. The rails can be represented by thin fuse wire and be held to the stanchion by a small neat blob of soft solder to represent the ball. There are some very good commercial stanchions which builders may prefer to making their own.

When all the detail has been completed, work can begin on the painting. The first coat to be applied should be a good primer. Make sure it is the right one for the job. If the hull and the superstructure have been built from metal, use a metal primer.

As I stated earlier in this serial, the reader can avail himself of two colour schemes and a change of name accordingly. Whichever scheme is chosen, the paint used should dry with a flat finish rather than a glossy one. Tugs are not seen all glossy with enamel paint; and so if our model is to be correct, enamel paint should be avoided. I know that the main objection to flat paint is that it holds the dirt more and is harder to keep clean, but this need not be so bad as some believe. For instance, one objection is that oily hands from the power plant stain the model. Why not wipe the oil off on a piece of rag first before putting the superstructure back? Still, each of us has his own way, and so I will leave you to decide exactly what kind of paint you will use.

The names of the colourings on the drawing are the same as those given to the builders. As they are essentially basic, with no indication of shade, I can imagine that all sorts of colours might be used for the model.

One colour which would definitely be incorrect, unless the reader had actually seen it, would be the boot-topping of *Moorcock*. Although it is labelled red on the drawing, in my opinion it is closer to a brown and I do not think that I am colour blind. Anyway, to help you to get your colours as near correct as possible I have done some experimenting with paints from the Humbrol range, manufactured by The Humber Oil Company Ltd. These paints are readily obtainable from most good model or toy shops and can be had in tins of half-a fluid ounce, a handy size, as only small quantities are needed in some instances.

The hull is black all over, including the bulwark rail on both *Moorcock* and *Dhulia*. There is, however, some very distinctive lining on either hull which will help to influence your choice. *Moorcock* has a thin yellow riband immediately below the bulwark rail all round the hull. Her name is in the same colour in bold letters on her bow and stern, with the port of registration, London, in smaller letters just below the name on the stern. Humbrol yellow No 8 is suitable for this.

The boot topping is in red, and the area painted is dimensioned on the drawing. The correct colour can be obtained by mixing three-parts of Humbrol authentic railway enamel No 110, red bauxite, to one of matt red No 32.

Dhulia has a white band all the way round the hull at the knuckle, and the name and port of registration in white. She has a green boot topping; Humbrol green malachite No 106 is as near as makes no difference.

The greater part of the superstructure, engine room casing, aft hatch, and the inside of the bulwarks are painted teak. You can get the exact shade by mixing one part of tan No 9 and one part of the red bauxite No 110. The curtain plate is white and so are all the handrails. All decks are red composition; it can be produced by mixing four parts of red bauxite No 110, three parts of matt red No 32 and one part of matt black No 33. These colours apply to both tugs.

The funnels are, of course, highly distinctive. As I have already given the arrangement of the colours, all that is required is the shades. The light blue for *Moorcock* is rather difficult to match, but a very close resemblance is brought about by mixing one part matt duck egg blue No 23 and one part sky blue No 13. The black is the same as the one used for the hull.

Round the funnel *Dhulia* has a red band which is very bright and has been difficult to match. It has a tendency to have a slight orange tint about it. Mix one part of yellow No 8 to one part of post office red No 19 and the result will not be far off.

All the other details and the respective colours are listed. When the painting is finished, the model will look very smart in either livery.

Some of the paints which I have mentioned are enamels which dry glossy. If a matt finish is preferred, when the paint is dry give it a coat of Humbrol transparent flat finish.

Before I bring this tale to a close, I have been asked about suitable power plants. What petrol engine would be in keeping with a motor tug?

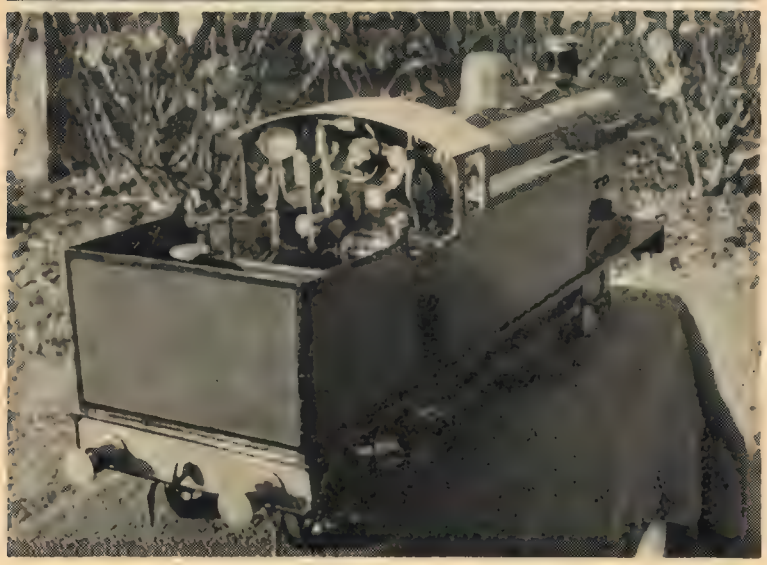
The 15 c.c. *Seal* would be appropriate for the ¼ in. scale and the *Sea Lion* 30 c.c. for the ½ in. If a single-cylinder engine is preferred to a multi-cylinder, any engine in the 10-15 c.c. range will do for the smaller model and 30 c.c. for the larger one.

Those who are faithful to steam should get by quite well with an engine similar to the Stuart 10 for the ¼ in. scale and the Double 10 for the larger model.

And so I come to the end of my story. I hope that it has given those who are attempting to build *Moorcock* as much pleasure as it has given me in sorting out all the details and describing them. If there are points which you cannot understand, I will be only too pleased to help you if you send me vour query with a stamped addressed enevelope.

The competition announced in MODEL ENGINEER and sponsored by Mr Richard O. Porter is a compliment to this serial, and I will look forward to seeing the models in the pond. I may add that the competition has aroused so much interest that, if sufficient models are finished in time this vear, Mr J. R. Watkin and Mr A. J. Page, the managing director of Ship Towage Ltd, will judge them. The Master of *Moorcock*, Mr R. A. Cole may also come along, and so you can meet some sound critics who will be only too pleased to discuss the models with you. ▣

■ **Began 9 June 1960**



TOMMY TOOK THREE YEARS

PETER TRINDER gets plenty of power from his little 3½ in. gauge tank engine

AFTER three years of somewhat spasmodic labour, my small 3½ in. gauge tank engine is at last completed. One or two minor troubles occurred in the trial running, but plenty of power is developed and the boiler steams freely.

The LBSC design is quite simple and straightforward. Its most interesting feature is the valve gear, a simple Hackworth using the inside crank webs as eccentric sheaves and enabling the radius rods to be attached above the die blocks. Contrary to popular opinion, little trouble occurs through the vertical movement of the axle on the springs altering the valve events in running. But care must be taken in adjusting the carrying springs once the valve gear has been set.

I have referred to some minor troubles; the first of them, a blown superheater element, was entirely my fault and I now know that the firebox ends of the superheater element must be brazed and not silver soldered ! The lubricator pump also caused anxiety through faulty setting out of the ports of the pump stand.

The locomotive, to be called *Tommy*, is painted dark blue, panelled black and lined in red. It is 27 in. over the buffers, weighs 50 lb., and has a boiler 12½ in. long and 4 in dia. with 3¾ in. dia. flues and twelve ⅝ in, tubes. The cylinders are bored out to 1⅛ in. and have slide valves on top of the block. Water feed is by a crosshead-driven pump with an ⅛ in. ram.

An injector is fitted and works very well. It is a commercial item supplied by Thomas and Amey, and is just the right size for a 3½ in. engine. For the average 5 in. gauge machine it would be a bit small. ▣

CLUB NEWS

Send news and notices to The CLUBMAN, 19-20 Noel Street, London W1.

THREE MORE

STILL more rally dates ! The other day I mentioned that at least three rallies were being organised of which I had not received details; I have since received notification of three but they are *all* new.

At Elham near Canterbury, a Whit Monday programme, organised by the Elham Village Hall Association under the direction of Mr A. G. Thompson begins at 11 a.m. with a clay pigeon shooting contest, a fun fair and side shows. Visitors also have a chance of looking over the engines. At 1.30 machines are in action with a tug-o'-war between tractors and steam engines. This is followed by a fire-fighting display which employs ancient and modern equipment. Other events are an archery contest for the budding toxophilite, a tractor gymkana, and a vintage car rally. Admission is 2s. (children 6d.). You will discover the village of Elham 6½ miles north-west of Folkestone.

On June 10 the East Anglian Traction Engine Club is holding its Stisted Rally at the same site as last year. Stisted is three miles NE of Braintree. A bus service run by the Eastern National Omnibus Company operates between Braintree and Stisted.

The same club also has a rally at Kelvedon on September 9. The rally site is one mile along the main A12 road from Kelvedon. An Eastern National Omnibus Company service operates past the site.

Details of the Elham rally may be had from Mr A. G. Thompson, "Avalon," Elham, Canterbury, Kent, and of the Stisted and Kelvedon rallies from Mr C. Hall, The Burrell, 55 Lichfield Road, Cambridge.

MEETS AT PAOLI

News comes from across the Atlantic of some live-steam meets. The Pennsylvania Live Steamers at their Paoli, Leopard and Sugartown railway will be holding meets on Saturday and Sunday June 3 and 4, June 24, July 29, August 26, September 23 and October 15.

The track provides for 2½ in., 3 17/32 in. and 4¾ in. gauge locomotives. It is three miles south of Paoli near the Valley Forge Interchange of the Pennsylvania Turnpike.

PADDLE STEAMERS

The Paddle Steamer Preservation Society is rapidly expanding. Just recently it has formed a London and Home Counties branch, and within the next few months it hopes to have a thriving Scottish area as well.

Visits are planned to the paddle tugs operated on the River Wear by France and Fenwick Co. Ltd, to the Medway Queen, to the three British Railways paddle ferries operating at Hull, and to the two Admiralty tugs *Pert* and *Camel* which are based on Devonport and are due for replacement this year.

If you are interested in the preservation of paddle steamers you should join the society. Details of membership can be obtained from Mr W. R. Horwood, 82 Kingswood Avenue, Bromley, Kent.

RALLY ROUND

May 13 Andover Rally. *Traction engine rally at Finkley Manor Farm, Andover, organised by the Andover MES. There will also be a model engineering exhibition.*

May 14 Birmingham Rally. *Traction engine rally at Newhall Street, Birmingham, organised by the City Museum and Art Gallery. There will also be a live-steam demonstration of stationary engines in the museum.*

May 20 Somerset Rally. *Traction engine rally at Shepton Mallet, 5 miles SE of the City of Wells.* ABANDONED.

May 21-22 Beaulieu Rally. *Traction engine rally at the home of Lord Montagu of Beaulieu. Beaulieu is in Hampshire 6 miles NE of Lymington and 2 miles NE of Beaulieu Heath.*

May 22 Great Wymondley Rally. *Traction engine rally at Great Wymondley which is halfway between Hitchin and Stevenage on the main A602.*

May 22 Woodton Rally. *Traction engine rally at Woodton Old Hall, Woodton, 5 miles from Bungay. Organised by the Norfolk Steam Engine Club.*

May 22 Shipton Rally. *Traction engine rally at Shipton-by-Beningborough, Yorkshire, 5½ miles NW of York.*

May 22 Elham Rally. Rally and Fete at Elham, a small village 6½ miles NW of Folkestone.

June 3 North Hykeham Rally. *Traction engine rally at North Hykeham which is 3¼ miles SW of Lincoln.*

June 10 Stisted Rally. Rally organised by the East Anglian Traction Engine Club at Stisted, three miles from Braintree. Bus operates between Braintree-Stisted.

June 10-11 Beaulieu Rally. *Rally at the home of Lord Montagu and headquarters of the Montagu Motor Museum. Beaulieu is in Hampshire 6 miles NE of Lymington and 2 miles NE of Beaulieu Heath. Organised by the Historic Commercial Vehicle Club.*

June 17-18 Revesby Rally. *Traction engine rally at Revesby Abbey, Bolton.*

June 17 Appleford Rally. *Rally at Appleford, 3 miles SE of Abingdon, Berks.*

July 1-2 Alton Towers Rally. *Rally at Alton Towers, 8 miles NW of Uttoxeter, Staffordshire. Organised by the North Staffs Traction Engine Club.*

July 15-16 Rempstone Rally. *Rally at Rempstone, 3½ miles NE of Loughborough.*

July 22 Redruth Rally. *Redruth is 9 miles SW of Truro, Cornwall.*

July 29 Kegworth Rally. *Rally at Kegworth, 5½ miles NW of Loughborough.*

July 29 Taunton Rally. *Rally at the county town of Somerset, Taunton, 44¾ miles SW of Bristol*

August 5-7 Woburn Rally. *Rally at the home of the Duke of Bedford, Woburn Abbey.*

August 12 Chatteris Rally. *Rally at Chatteris, Cambridge. Organised by the East Anglian Traction Engine Club.* Date changed to July 1.

September 9 Kelvedon Rally. Site is a mile along the main A12 from Kelvedon. Eastern National Omnibus Company buses pass the site.

September 10 Basildon Rally. *Rally at the premises of Messrs Harold Wood at Basildon. Essex.*

CLUB DIARY

Dates must be sent at least four weeks before the event

May 11 Grimsby SMEE. Boat building instruction at 7.30 p.m.

May 11 Sutton MEC. AGM and craftsman of the year competition.

May 13 Grimsby SMEE. Regatta at the pond at 2.15 p.m.

May 13 Welling and District MES. Blackheath MPBC social at the Mitre Hotel, Greenwich.

May 13 Bristol SMEE. Running day at Canford Park.

May 13-14 City of Leeds SME. Track meeting at Temple Newsam.

May 13-14 Poole MYC. Regatta at Poole. Open to all radio control vessels.

May 14 North London SMEE. St Albans SME visit to North London SMEE at Arkley.

May 14 Watford SME. Visit to North London SMEE at Arkley.

May 14 North London SMEE. We entertain Watford and St Albans SME at Arkley.

May 14 Birmingham SME. Visit to s e Mr Middleton traction engines at Hartlebury.

May 14 Brighouse and Halifax SMEE. Regatta at Shibden Park, Lake, Halifax.

May 14 Maidstone MES. Track day at Mote Park.

May 14 Worcester SMEE. Track day at Waverley Street, Diglin, Worcester.

May 14 North London SME. First open meeting of the model car section to be held at the Lee Valley Water Company Sports Ground at Arkley at 2.30 p.m.

May 16 City of Leeds SME. Track meeting at Temple Newsam

May 17 Southampton and District SME. Meeting at 108 Winchester Road, Shirley, Southampton.

May 18 Bristol SMEE. Lecture by Mr Kerswill on some experiences with Messrs P. and A. Campbells.

May 18 Bristol SMEE. Meeting at the Games Room of the YWCA.

May 19 Rochdale SME. General meeting at Lea Hall, Smith Street, Rochdale.

May 19 Warrington and District MES. Meeting at Earlestown.

May 19 Coventry MES. Rugby MPD visit.

May 20 Welling MPBC. Regatta at Belvedere Recreation Ground. SR only.

May 20 Wigan MES. Meeting at St Michael's Institute, Earl Street, Swinley, Wigan at 7.30 p.m.

May 20 Bristol SMEE. Running day at Canford Park.

May 20 Birmingham SME. Invitation to the Witney and Axford SME at Blenheim Palace.

May 20-22 City of Leeds SME. Open day at the track at Temple Newsam.

May 21 Brighton MPBC. Regatta at Hove Lagoon. RC only.

Advertisments, with remittance, should be sent to Classified Advertisement Department, Model Engineer, 19-20, Noel Street, London, W1, by latest Thursday morning prior to date of publication. Advertisements will be accepted from recognised sources by telephone. GERRARD 8811. Ex. 31.

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Buck & Ryan for Lathes and Workshop Accessories, drilling machines, grinders, electric tools, surface plates, etc.—310-312, Euston Road, London, N.W.1.

Myford ML7 and Super 7 Lathes for prompt delivery. Cash or terms.—VICTA ENGINEERING, Maidenhead, Berks.

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"WESCO" Works, Birmingham 28.

Eagle Surface Grinders from £188. Early deliveries. Cash or terms.—VICTA ENGINEERING, Maidenhead, Berks.

New Marlow Vertical Mills, 22" × 6½" motorised, from £210. Cash or terms.—VICTA ENGINEERING, Maidenhead, Berks.

Wanted. Vertical Slide Suit ML7, M.E. dies, boiler material, "Lassie," "Maisie," "Maisie" book, drawings.—MCDONALD, 12, Bath Street, Stonehaven, Kincardineshire.

36" Sheet Metal Hand Folder, £15. 36" sheet metal foot operated guillotine, £15.—JONES, 20, Beckenshaw Gardens, Woodmansterne, Banstead, Surrey.

Wanted. Tailstock change wheels for old pattern 3½" Drummond.—RICHARDS, Park House, Pontefract.

Burnerd 5" Self-centring Lathe Chuck, heavy duty, new, £8 5s. Black and Decker heavy duty drill, 240 v., new, £14. Desoutter pneumatic air nibbler, new.—PAGE, 135, Green Lane Road, Leicester 68863.

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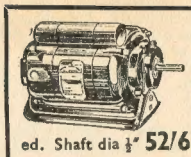

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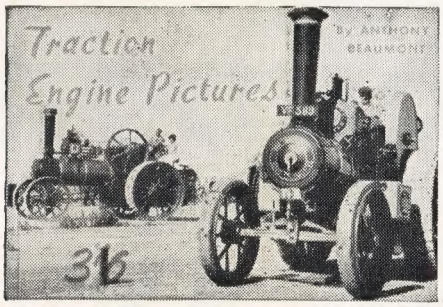

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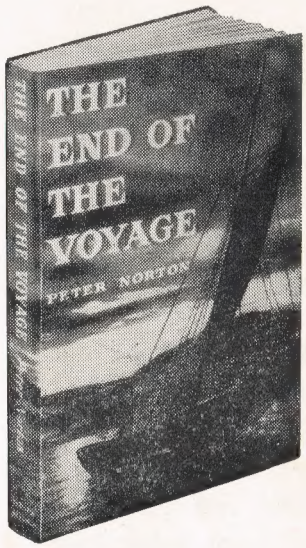

A lifetime of enthusiasm and careful, painstaking research preceded the production of this book, which is a detailed description of many of the different kinds of sailing craft to be seen until recently in British coastal waters.

All the principal types of vessel are described and in each case the author has included a full page drawing prepared by himself which is a reconstruction of the vessel depicted at sea during its heyday. The written text provides a commentary on each of these drawings by giving all the facts and information about the craft; the history of the type, the way it was worked, the why and wherefore of its construction and rigging, the particular trade or cargo—and so forth.

The photographs and plans illustrate detailed characteristics. The plans show lines, plan and elevation and sail plan of some well-known vessel, reproduced from the archives of the Science Museum, South Kensington. The photographs show some aspects of an actual vessel to demonstrate a point of construction or working.

A bibliography and index are included.

This book is a " must " for all maritime enthusiasts and because of the author's very thorough and detailed study of the construction and rigging of these coastal craft, it will be found to be of great interest and help to ship modellers.

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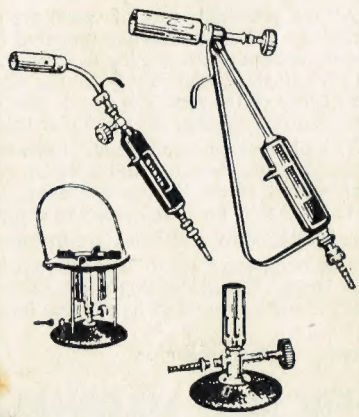

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